American Foundryman

MARCH
1955

Boston AFS Convention
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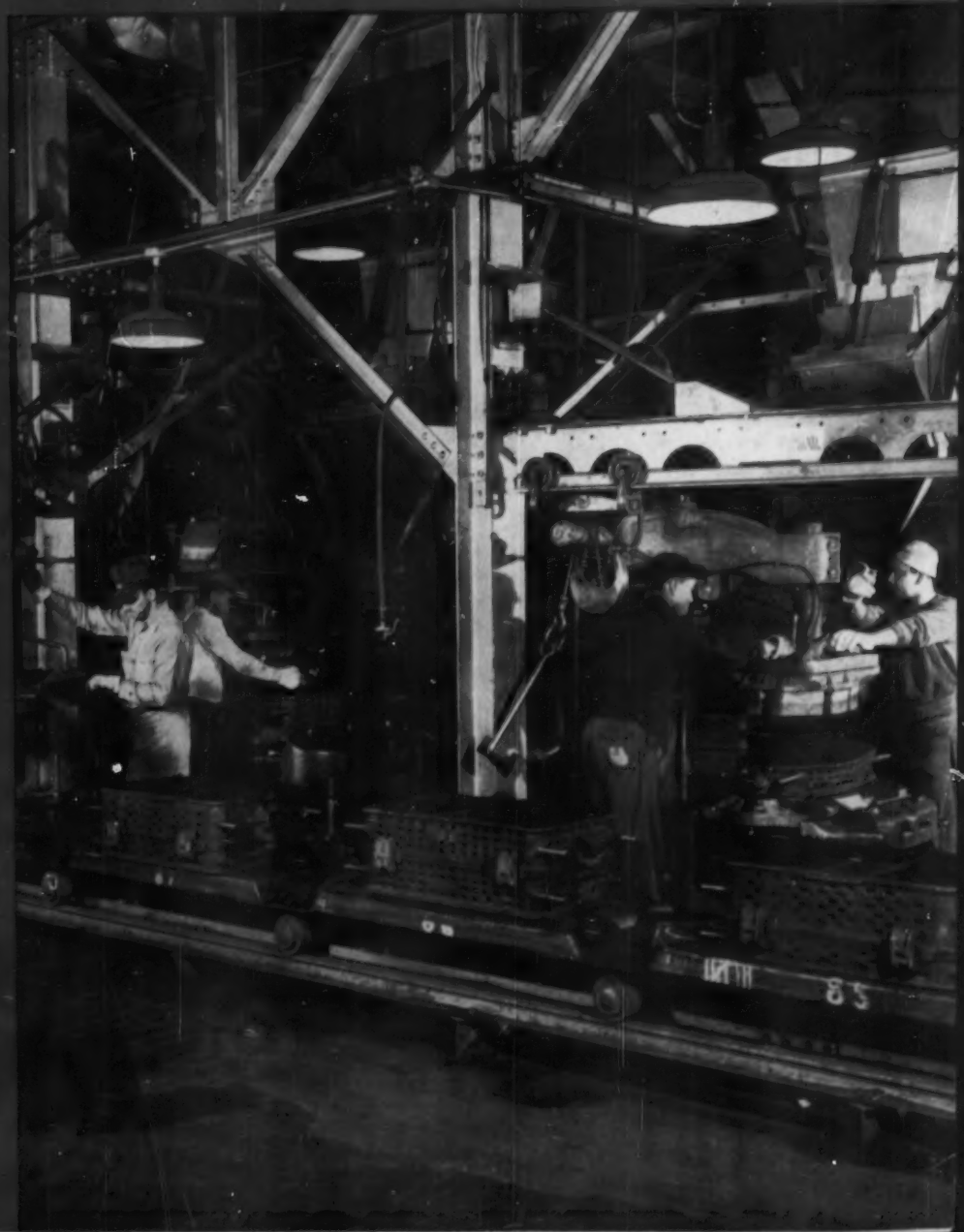
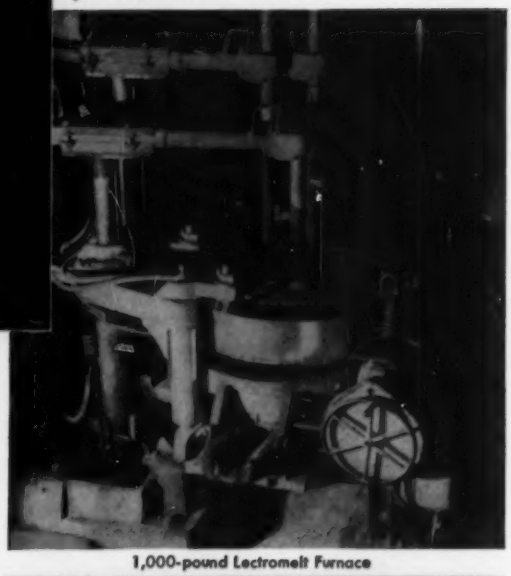
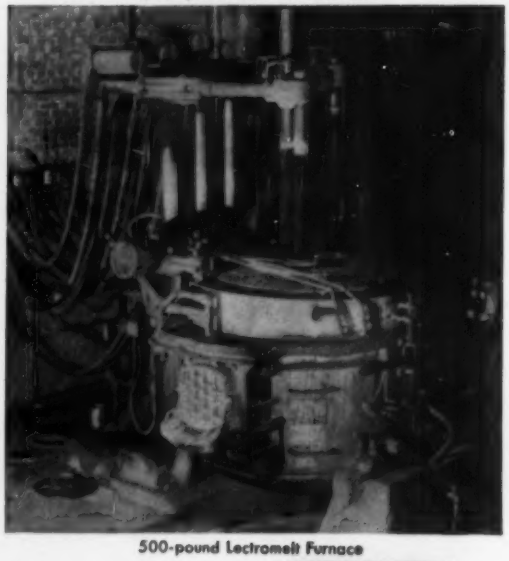


The Foundrymen's Own Magazine

3,000-pound Lectromelt Furnace



1,000-pound Lectromelt Furnace



500-pound Lectromelt Furnace

We like the FLEXIBILITY provided by our 3 Lectromelt furnaces

SAY ELECTRO-ALLOYS DIVISION, AMERICAN BRAKE SHOE COMPANY, ELYRIA, OHIO

Electro-Alloys can make quick shifts in alloys melted and weight of metal cast, thanks to the flexibility offered by these three Lectromelt* Furnaces. By keeping the small furnace on Ni-Resist exclusively, they avoid the need for wash heats and assure integrity of the alloy.

They cast a great many different alloys, and the castings range in weight all the way from a few ounces to 13,000 lbs., calling upon the additional capacity of other furnaces.

Precise control of melting conditions is inherent in Lectromelt equipment. Whether you're working with iron, plain carbon or alloy steels, a Lectromelt Furnace will give you this advantage.

Lectromelt engineers will answer your questions and supply you with catalog data on Lectromelt Furnaces—25 lbs. to 150 tons. For Catalog No. 9, write Pittsburgh Lectromelt Furnace Corporation, 316 32nd Street, Pittsburgh 30, Pa.

Manufactured in... GERMANY: Friedrich Kocks GMBH, Dusseldorf... ENGLAND: Birlec, Ltd., Birmingham ... FRANCE: Stein et Roubaix, Paris... BELGIUM: S. A. Belge Stein et Roubaix, Bressoux-Liege ... SPAIN: General Electrica Espanola, Bilbao ... ITALY: Forni Stein, Genoa. JAPAN: Daido Steel Co., Ltd., Nagoya

*REG. T. M. U. S. PAT. OFF.

MOORE RAPID

WHEN YOU MELT... *Lectromelt*

For more facts, circle No. 93 on postage-free Reader Service card on p. 17 or 18

Taking a *"thumping"* from lumpy shakeout? Don't worry! There's a sure way out! Adding Federal SAND STABILIZER (a processed cellulose sand additive) to your sand, dry or in slurry, will give you a better, less lumpy shakeout, *without* adding other clays to your sand mixture. For, among the many advantages afforded by this highly efficient sand additive is its ability to eliminate lumps in sand shakeout and improve core knockout.

In addition to improving shakeout, you'll find, during the pouring period, that Federal SAND STABILIZER burns out at a much faster rate than any other type of facing material. Since it has a very low ash content and has no deteriorating effect on sand, the re-use of your molding sand can be practiced with *complete safety*.

Federal SAND STABILIZER greatly improves the flowability of sand, too—providing much better ramming conditions. When added to facing or backing sand, more uniformly rammed mold surfaces will be obtained, thus providing smoother casting finish. When added to bentonite slurry, STABILIZER sharply reduces viscosity of solution, permitting the addition of more bentonite to the slurry for greater strength, if desired.

Yes, Federal SAND STABILIZER can be a big help to you! Especially so, if used along with Federal's CROWN HILL SEACOAL—the low sulphur seacoal, and GREEN BOND BENTONITE—the long-lasting bentonite. These three outstanding sand additives will really give you easy, uniform, *thoroughly dependable* sand control. To learn more about them, write for Federal's bulletin: "Tailor-Made Molding Sands".

FEDERAL

If you have "lumpy shakeout" — use Federal SAND STABILIZER!

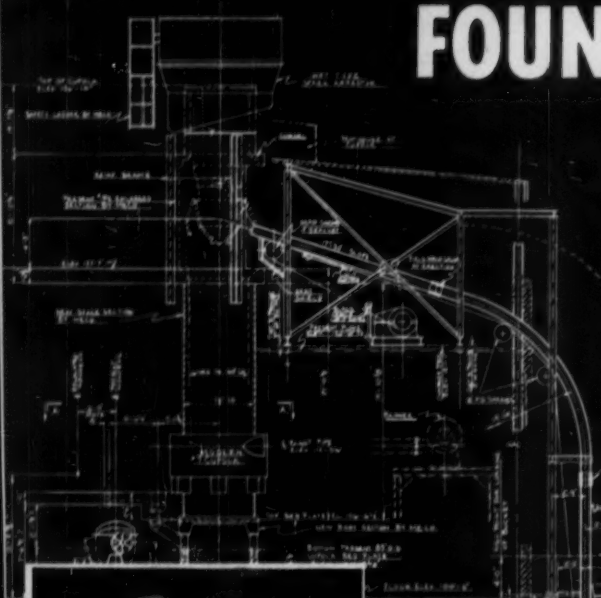
The **FEDERAL FOUNDRY SUPPLY** Company

4600 EAST 71st STREET, CLEVELAND 5, OHIO

CROWN HILL W. VA. • CHICAGO • DETROIT • MILWAUKEE • RICHMOND VA. • ST. LOUIS • CHATTANOOGA • NEW YORK • UPTON WYO.

For more facts, circle No. 78 on postage-free Reader Service card on p. 17 or 18

AUTOMATION *for* FOUNDRIES *too!*



Off-set skip is designed for accessibility in a restricted, yard area.

Front slagging system eliminates much hard work and maintains clean operating conditions in the cupola area.

Conveyor at de-watering tank travels 6' a minute.

ENGINEERING... MANUFACTURING... ERECTION...

Ever since MODERN engineered the first, skip-type, mechanical charger an array of automatic controls has continued to ease the work for foundrymen. From Monday's start to Friday's shake-out the costs of the castings are closely controlled. Push button operation, here at Producto Machine Company, already includes:

- **Automatic cycling of the small-cone bucket between pit and trip switch . . .**
- **Slag flowing continuously from front-spout to drag-out . . .**
- **Dust and ash are trapped behind a water curtain . . .**
- **Bins and automatic weight controls, for coke and stone, are planned as future additions . . .**

Whatever your tonnage requirements are your costs, too, can be controlled AUTOMATICALLY!

Metal is thoroughly mixed as it flows continuously through the 4000 lb., MODERN forehearth.

MODERN

Dept. A-3
Modern Equipment Co.
Port Washington, Wis.

Mail to my attention:

Catalog #147-A cupolas, chargers, hot blast.. ☐
Catalog #P-152 — ladles and Pouring ☐
Catalog #150, Cranes, Monorail ☐
Information on Sound, Color Films ☐

Company ..... *Street* .....
City ..... *State* .....
Name .....

MODERN REPRESENTATIVES IN ALL PARTS OF THE WORLD

American Foundryman

Volume 27 *March 1955* *Number 3*
Published by American Foundrymen's Society

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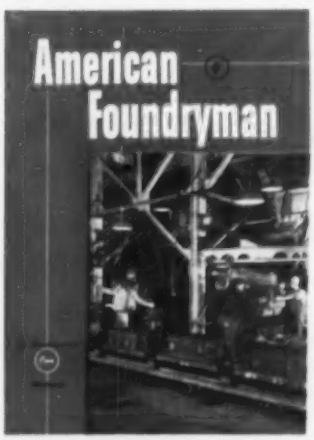

Studebaker-Packard V-8 parts molding line feeds castings to the cleaning room described in Harrison A. Graber's Cleaning Room Control article appearing on pages 34-37.

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Hot under the collar

...or Chuck Wright's key to top performance

"PANCAKE DAY... the Tuesday before Lent . . . opened bright and sunny. But to Ernie Burgess, Nonesuch Foundry's super., it was a bleak morning," announced Chuck Wright.

"When I stepped into his office," added the INCO distributor foundry specialist, "Ernie was patting a handkerchief to the back of his neck. He looked like a man who could really use a pancake today. For a poultice.

"All I could do was ask: 'What's the strife, Ernie?'

" 'One of our best customers,' he complained, 'one of our largest users of compressor cylinder castings . . . pffft . . . right out the window.'

"Not a pleasant surprise, I thought, to lose that business. And they lost it in spite of technical progress made in this foundry over the past several years.

"It was another case of too many rejects. Hard spots, porosity, lack of uniform, close grain lost it. The customer needed pressure tightness in the cylinders. Plus good machinability, and wear resistance.

"I pointed out to Ernie that he might possibly get these properties by maintaining precise control of the basic chemical composition, the pouring temperature, the sand condition and so forth. I realized, of course, that holding all these to very narrow limits is a terrific gamble for anybody.

"But no foundryman needs to gamble . . . not even with a single heat. So I said to Ernie, 'You know I've told you before how to get exactly what this buyer wants. Relax, man. Use a little nickel.'

"Ernie followed my suggestions. He added 1 to 1½% nickel. From this mix, he shipped a few sample castings to the former customer.

"And here's what happened. Ernie has the customer back on the order book again and Nonesuch is getting new business from other accounts. Every one of them calling for castings that not only machine readily, but also to meet other specific demands. They want wear resistance, higher strength and the like . . . for end-uses requiring top performance.

"There's been a lot of progress made in foundry technique. But after all, you'll find that use of a little nickel will stop a lot of troubles . . . in the machine shop as well as in the foundry and in the field.

"Next time there's a hitch in your work, you may want some practical answers on the metallurgy of castings. Just call on me for help."

Chuck Wright

P. S. "The easiest way is to drop me a line in care of INCO."

INCO TRADE MARK

The International Nickel Company, Inc.
67 Wall Street New York 5, N. Y.

For more facts, circle No. 82 on postage-free Reader Service card on p. 17 or 18

a move to

Famous CORNELL CUPOLA FLUX

cuts your scrap loss...

Famous Cornell iron cupola flux cuts scrap losses by creating conditions whereby iron and slag become hotter and more fluid. This saves you many dollars because there is less digging out since drops are cleaner. In addition, Famous Cornell Flux offers better control of melting and metal composition.

HOW FAMOUS CORNELL FLUX WORKS

Famous Cornell Flux is a scientifically prepared mixture of high-grade fluorspar and other materials which cause a chemical reaction in molten iron. This reaction causes a tremendous increase in the amount of slag that floats and flows off. Metal is cleaner, sulphur is greatly reduced. Famous Cornell Flux is made in scored brick form. With each ton charge of iron, you simply toss one brick into the cupola. For charges less or more than a ton, just break off a proportionate number of scored sections. *It's that easy and it's that economical.* Only a few cents per ton of metal.

You'll find that Famous Cornell Flux consistently helps give you castings that are easier to machine and have greater tensile strength throughout.

CALL YOUR CORNELL FLUX ENGINEER

Without obligation, we will send an experienced Cornell Flux engineer to your foundry to discuss ways and means to improve the composition of your gray iron, brass and aluminum castings. Call today or write for Bulletin 46-B.

As for Aluminum or Brass . . . You Benefit 8 WAYS with Famous CORNELL *Aluminum and Brass Flux*

- Makes metal pure and clean.
- Permits use of more scrap without danger of dirt, porous places or spongy spots.
- Thinner, yet stronger sections can be poured.
- Metal does not cling to the dross.
- Crucible or furnace linings are kept clean and preserved.
- Cleanses molten brass even when the dirtiest brass turnings or sweepings are used.
- Saves considerable tin and other metals.
- Forms a perfect covering over the metal during melting, prevents oxidation and reduces obnoxious gases to a great extent.

Write for Bulletin No. 46-A

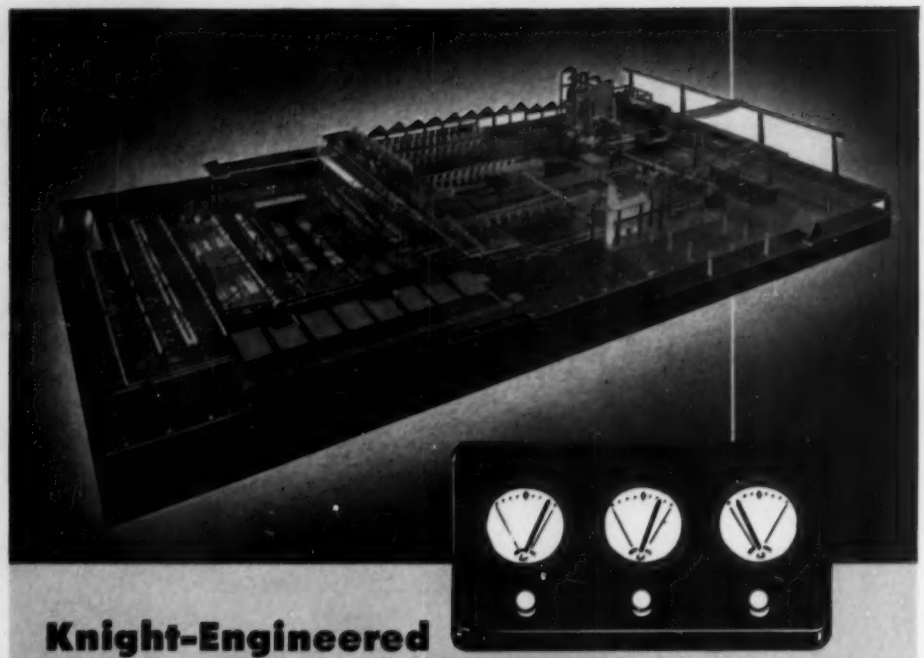
The CLEVELAND FLUX Company

1026-40 MAIN AVENUE, N. W. • CLEVELAND 13, OHIO

Manufacturers of Iron, Semi-Steel, Malleable, Brass, Bronze, Aluminum and Ladle Fluxes—Since 1918

FAMOUS CORNELL FLUXES

Trade Mark Registered



Knight services include:

- Foundry Engineering
- Architectural Engineering
- Construction Management
- Organization
- Management
- Industrial Engineering
- Wage Incentives
- Cost Control
- Standard Costs
- Flexible Budgeting
- Production Control
- Modernization
- Mechanization
- Methods
- Materials Handling
- Automation
- Survey of Facilities

Knight-Engineered AUTOMATION

increases labor productivity 52% in major foundry

Experienced Knight Engineers, working closely with the client's staff, completed the automation of this foundry unit 18 months ago.

The successful integration of foundry operations into a continuous production sequence, *from raw material to finished product*, increased over-all labor productivity 52%. In one operation alone, 9 men now produce what 53 men formerly produced.

Automation has also accelerated materials handling, established uniform product standards, improved worker morale, increased space productivity 33%, and brought major economies throughout the over-all operation. Necessary changes were scheduled progressively so that automation was accomplished without interrupting production.

The successful operation of this foundry is just one example of Knight's practical experience in the engineering services that increase foundry productivity and decrease unit costs.

Your operation will benefit by the comprehensive experience of Knight Engineers who have completed approximately 400 foundry assignments. A letter will bring a call from a Knight representative at your convenience.

EVIDENCE OF EXPERIENCE

Lester B. Knight & Associates, Inc.

Consulting Engineers

MEMBER OF THE ASSOCIATION OF CONSULTING MANAGEMENT ENGINEERS, INC

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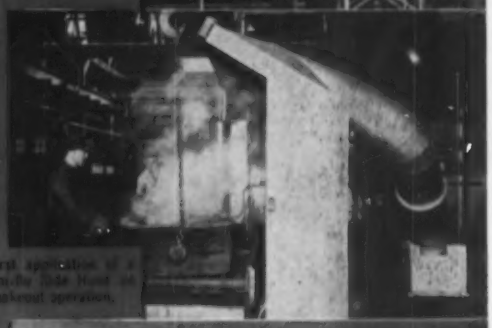
917 Fifteenth St., N. W., Washington 5, D. C. • Lester B. Knight & Associates, 30 Church St., New York 7

For more facts, circle No. 84 on postage-free Reader Service card on p. 17 or 18

SOME SCHNEIBLE "FIRSTS"
1935–1955

20 years
OF PROGRESS
IN
FOUNDRY DUST COLLECTION, VENTILATION
AND
AIR POLLUTION CONTROL

1935 One of the first Multi-Wash Dust Collector installations.



1936 First application of a Under-the-Side Hood at shakeout operation.

1941 Another first—"SW" Cupola Collector at automotive foundry.

1947 First gravity-action "Cooperation" Pouring Hoods for production foundries.

1948 "Cooperation" Shakeout Hood at

SCHNEIBLE DUST CONTROL APPLICATIONS

Shakeout, Sand Preparation, Casting Cleaning, Grinding, Cupola Exhaust, Core Making, Pouring Stations, Mold Cooling, Furnace Exhaust

SCHNEIBLE EQUIPPED FOUNDRIES

Grey Iron Foundries, large and small; Malleable Iron Foundries, large and small; Steel Foundries; Aluminum Foundries; Brass and Bronze Foundries; Magnesium Foundries

All Schneible Equipment is covered by patents in United States and foreign countries.

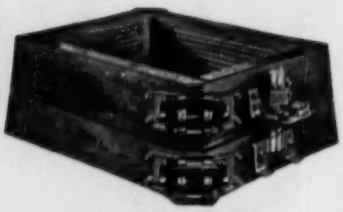
SCHNEIBLE

FOUNDRY EQUIPMENT MANUFACTURERS ASSOCIATION INC. MEMBER FEMA

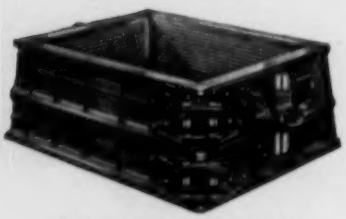
CLAUDE B. SCHNEIBLE COMPANY
P. O. Box 81, North End Station • Detroit 2, Michigan
Cable Address: CBSCO
European Licensee: Elox S. A., Zurich, Switzerland

REDUCE YOUR COSTS

ADAMS Cast Iron or Cast Aluminum Jackets



CHERRY EASY-OFF FLASK



ALUMINUM EASY-OFF FLASK

Look at these features and you'll agree that the Adams line can mean economy, efficiency, and better molds for your foundry.

Above is the Adams jacket available in either cast iron or cast aluminum. They are cast from a top grade metal mixture best suited for their purpose. The sturdy construction as a result of the vertical ribs inside and horizontal ribs outside plus the handles at either end assure you of long life for this equipment and ease in handling. These jackets afford you MAXIMUM STRENGTH with MINIMUM WEIGHT.

Here are jackets that assure you perfect mold fit—will give you the greatest strength while under pouring strain—allow for free flow of gases all because of INSIDE CORRUGATIONS. These VENTILATED jackets are first choice in foundries across the nation.

Look into the advantages cast iron or cast aluminum can offer you depending upon your foundry needs. We will be happy to make recommendations to fill your requirements.

The ADAMS Company

ESTABLISHED 1883

MOLDING MACHINES and FLASK EQUIPMENT

700 FOSTER ST., DUBUQUE, IOWA, U.S.A.

For more facts, circle No. 66 on postage-free Reader Service card on p. 17 or 18

OREFRACTION

ZIRCON SAND AND FLOUR

For Foundry Practice—

- DOMESTIC & AUSTRALIAN ZIRCON FOUNDRY SANDS
- ZIRCON FOUNDRY FLOURS IN 200 AND 400 MESH PARTICLE SIZES

From Orefraction Inc., a large and leading American processor of Zircon ores.

Orefraction Inc.
7425 THOMAS ST., PITTSBURGH 8, PA.

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- Industrial Foundry Supply Co., San Francisco
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- Frederic B. Stevens of Canada, Ltd., Windsor; Toronto
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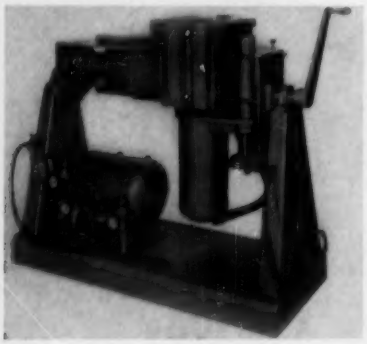
Products & Processes

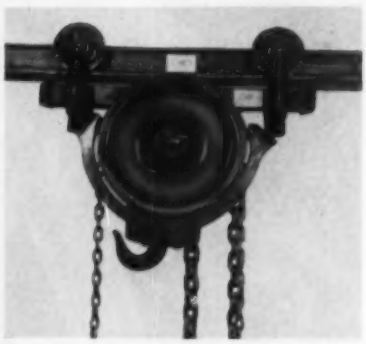
Fill out postcards on pages 17-18 for complete information on items listed on pages 10-12-17-18-21-22



▼ Core Rod Straightener

Equipment is now available which quickly and economically straightens even the most badly bent core rod, sorts it according to length and delivers the rod to its proper size bin for easy, convenient use by the core-maker. Designated the Rodmizer, this automatic machine eliminates much of the constant cost of replacing core rods and enables practically all of the rods to be used repeatedly. A substantial savings in core room labor is effected. Additional literature and information is available. *Hydro-Blast Corp.*

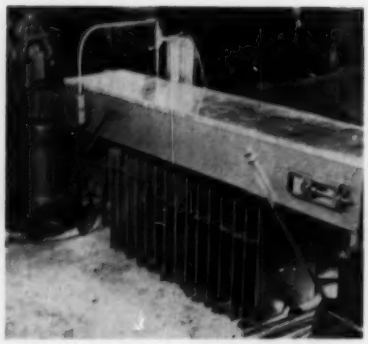
For more facts, circle No. 3 on p. 17



▲ Shell Core Blower

New shell core blower, unlike the old gravity-type shell core machine, can use either gravity-type investment or standard core-blowing techniques. It is similar in operation to conventional core blowers, except that the core box is heated, and phenolic resin is used instead of conventional core bonders. Machine is designed for use with conventional core boxes. Completely cored shells, ready for setting, are produced at a rate of one core every 30-50 seconds, depending on wall thickness. *Shalco Engineering Corp.*

For more facts, circle No. 1 on p. 17



▲ Low Headroom Trolley

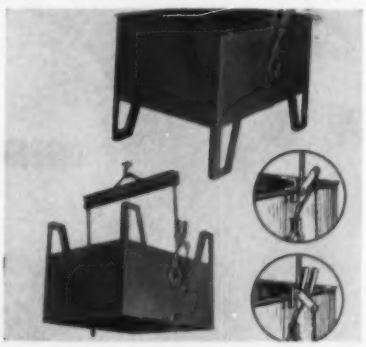
New Ohio Tramrail Trolley design developed for low headroom situations, and available for use with chain blocks, electric hoists and special applications is announced. In effect, the new design enables the chain block or electric hoist to be built-in rather than hook-suspended from the trolley. Lo-Headroom "built-in" design is available for one, two and three-ton trolleys of four or eight-wheel design. In both four and eight-wheel construction, load bars are of channel-shape, constructed of rolled steel. *The Forker Corp.*

For more facts, circle No. 5 on p. 17

▼ New Tractor-Shovel

More than three years of development and field-testing have gone into an entirely new "HA" model Payloader tractor-shovel. New model has twice as much lifting, digging and carrying capacity as its predecessor. Bucket has been increased 16⅔ per cent, giving the HA a payload capacity of 18 cf and a struck-load capacity of 14 cf. New unit is more maneuverable machine with a shorter turning radius than the former model. Complete information and literature is available. *Frank G. Hough Co.*

For more facts, circle No. 4 on p. 17



▲ Plaster Release

Master Plaster Release is a liquid product that releases plaster casts from wood, metal or plaster patterns and coreboxes. Exact reproductions are obtained because no fillets are formed by the release and there is no buildup to affect accuracies when it is used. Contains no ingredients such as lards, oils or stearic acid which tend to soften various types of plaster. Release is packed in spray cans which makes possible its use by simply pressing a button and directing the spray to the proper surfaces. *Kindt-Collins Co.*

For more facts, circle No. 2 on p. 17

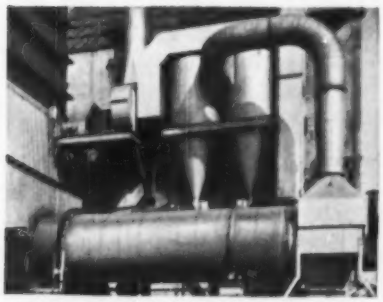
▲ Automatic Dump Box

An automatic dump box designed for handling all types of materials and parts, has been announced. Unit can be used with hand, power lift of fork truck or it can be picked up and moved by overhead hoist. Gravity latch locks box in upright position until ready for dumping. Built of heavy gauge steel with reinforced flange around top edge. Has heavy angle legs and reinforced plate at location of trunnion. Box is 48 in. long, 36 in. wide and 24 in. deep inside. *Palmer-Shile Co.*

For more facts, circle No. 6 on p. 17

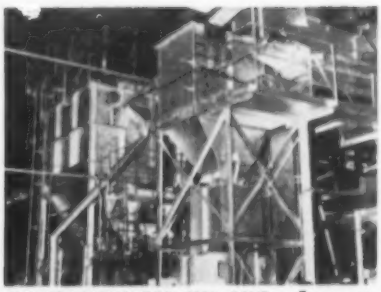
continued on page 12

For handling sand and castings--



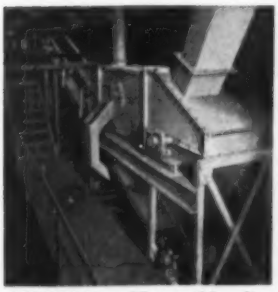
DRYERS — Link-Belt Roto-Louvre uniformly dries and cools large tonnages of sand. Floor space is conserved because no extra cooler is required.

SHAKEOUTS AND SCREENS — Complete line provides centralized separation of sand and castings or sand screening for every type and size foundry.

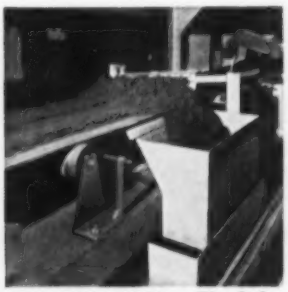


BUCKET ELEVATORS AND BINS — Low-cost elevating and storage of sand. Sturdily built in a wide range of types and sizes.

LINK-BELT quality equipment...



REVIVIFIERS — Thoroughly disintegrate, blend, cool molding sand so it will ram to uniform density. Also remove shot.

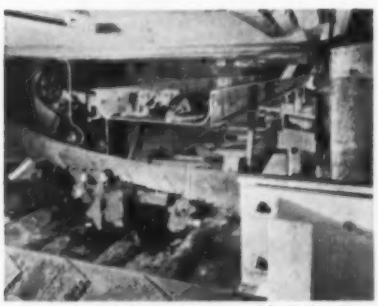


BELT CONVEYORS — Flat belt has plows to distribute sand to molders' hoppers. Troughed type used for other sand handling.

MOLDING HOPPERS — Built to avoid arching and allow free sand discharge with easy-operating duplex discharge gates.

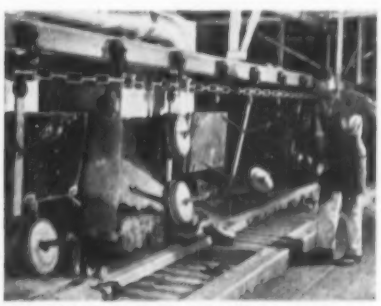
MOLD CONVEYORS — A full line of car, pallet, roller and trolley types meets all variations of foundry practice.

cuts your costs every step of the way



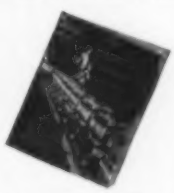
OSCILLATING CONVEYORS — Ideal for hot shakeout sand and castings. One-piece, all-metal trough eliminates wear, leakage. With screened trough section, acts as shakeout.

APRON CONVEYORS — No-leak design for long-life service on hot sand and castings. Operates in horizontal or steeply inclined paths. Also good as sorting conveyor.



OVERHEAD TROLLEY CONVEYORS — Cores, molds and castings are economically handled. Complete flexibility of path and capacity provided plus saving of floor space.

Ask your nearest Link-Belt office for new Book 2423. It shows Link-Belt's complete line of modern equipment for ferrous and non-ferrous foundries plus 7 tested layouts.



LINK-BELT

CONVEYORS AND PREPARATION MACHINERY

MEMBER FEMA

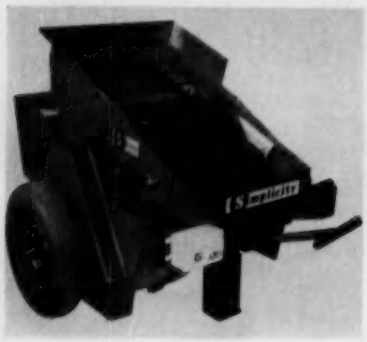
LINK-BELT COMPANY: Executive Offices, 307 N. Michigan Ave., Chicago 1. To Serve Industry There Are Link-Belt Plants and Sales Offices in All Principal Cities. Export Office, New York 7; Canada, Scarboro (Toronto 13); Australia, Marrickville, N.S.W.; South Africa, Springs. Representatives Throughout the World.

13:355

Products & Processes

continued from page 10

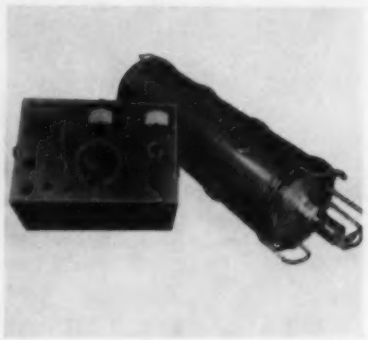
Fill out postcards on pages 17-18 for complete information on items listed on pages 10-12-17-18-21-22



▼ Wire Straightening Machine

Short lengths of wire from one to 12 in. long and up to ⅛ in. in diameter are straightened and cut to size accurately and quickly by the Lewis No. 7 wire machine. Unit can be hand operated for production of small quantities of wire, or belt or motor driven for increased production. Graduated scale simplifies adjustment to produce any desired length of wire. Practicality and durability have been proven in extensive use by foundries in the preparation of core wire and in other industries. *Lewis Machine Co.*

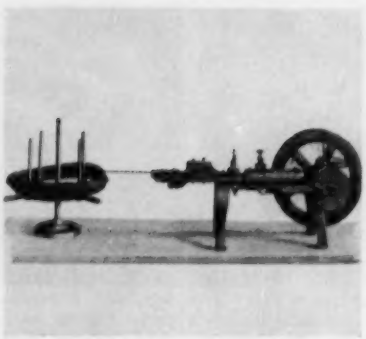
For more facts, circle No. 9 on p. 17



▲ Sand Conditioner

Compact two ft by three ft portable foundry sand conditioner equipped with large diameter pneumatic tires for easy movement on uneven or sand foundry floors, is now available. Unit screens, aerates, and fluffs foundry sand in one operation and will handle 10 to 15 tons of sand per hour, or if fed manually—all the sand two men can shovel. The sand is fed directly on the screen. All lumps and balls of good molding sand are broken down by the lump-breaker. *Simplicity Engineering Co.*

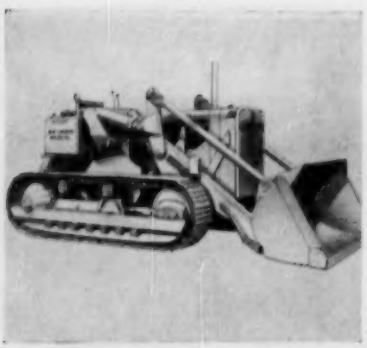
For more facts, circle No. 7 on p. 17



▲ Portable X-Ray Unit

New, U. S. made, versatile, portable unit for complete circumferential x-ray of weldments and construction of pipe lines, castings, boilers, tanks and similar equipment in the field and in industrial plants has been developed. The high powered, light weight unit, called the X-Tron 180, contains a specially designed transformer and x-ray tube and a high voltage generator. Unit will penetrate 2 1/8 in. of steel and will traverse a pipe line greater than 12 in. in diameter. *Mitchell Radiation Products Corp.*

For more facts, circle No. 11 on p. 17



▼ Mixing Machines

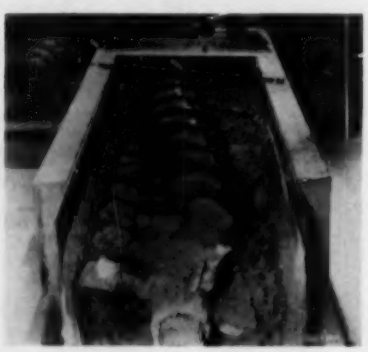
New line of continuous-type mixing and pugging machines, engineered to handle any size material from dust to 1½ in., in either a dry state or in a slurry, is now available. Mixers, which are manufactured in standard sizes, are engineered with production capacities to suit specific requirements. They find wide application in such industries as foundry, chemical, metal producing and steel mills. Power requirements are generally one-fifth of batch operations because no peak loads are involved. *Colonial Iron Works Co.*

For more facts, circle No. 10 on p. 17

▲ Tractor Shovel

A new, more powerful two yd model HD-9G Tractor Shovel, with design modifications and construction improvements, offering greater productivity, longer life, maintenance simplicity, ease of operation and maximum visibility, has been announced. Unit produces 100 net engine horsepower and 82 drawbar horsepower—simultaneously handles maximum traction and hydraulic pump power requirements. Incorporates a new ceramic master clutch lining originally developed for aircraft wheel brakes. *Allis-Chalmers Mfg. Co.*

For more facts, circle No. 8 on p. 17



▲ Core Blowing Vents

Powdered Metal core blowing vents have recently been developed. They were designed for venting Dietert Process patterns and core boxes and have the advantage over conventional vents, it is claimed, in that they will not leave an impression of the finished shell. They consist of a porous metal disc mounted in a brass ferrule. Disc is mounted flush with the end of the ferrule and forms a continuous surface on the pattern. *Harry W. Dietert Co.*

For more facts, circle No. 12 on p. 17

continued on page 17

Controlled Grinding Produces Absolutely Uniform

Supersil

SILICA FLOUR

And uniformity pays off in better castings

HUGE, MODERN GRINDING MILLS, equipped with the latest electronic controls, assure the high chemical purity and perfect uniformity of Supersil Silica Flour.

If you want better castings with super-smooth finish — and what foundryman doesn't—be sure to use Supersil.

In your mold wash, uniform Supersil always gives the same even coating. Its high fusion point and excellent refractoriness reduce metal penetration and help to prevent surface defects.

For further information and samples of Supersil, send the coupon today to Pennsylvania Pulverizing Company, leading producers of Quality Silica Flour.

Supersil is another PENN-SAND product.

PENNSYLVANIA PULVERIZING COMPANY
TWO GATEWAY CENTER, PITTSBURGH, PA.

Please send me further information and samples of each PENN-SAND product checked below.

Name .....

Company .....

Address .....

City ..... State .....

☐ MOLDING SAND ☐ CORE SAND ☐ SANDBLAST SAND
☐ SHELL-MOLDING SAND ☐ SILICA FLOUR

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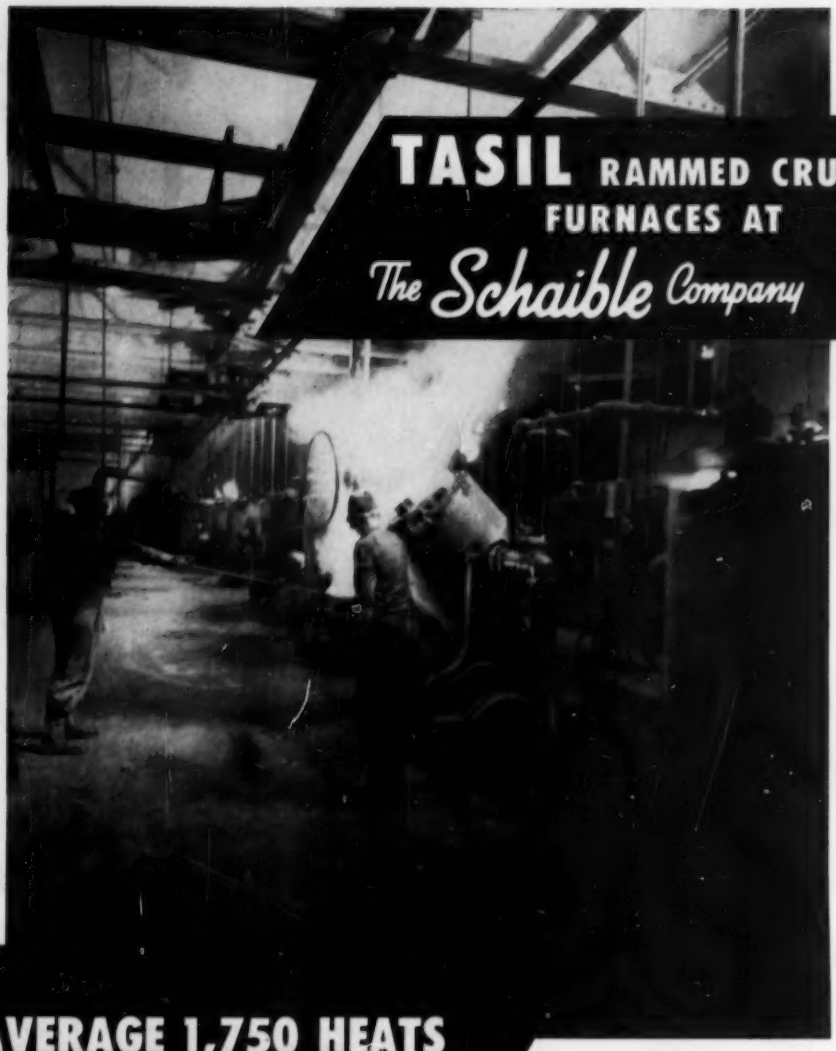
For more data, circle No. 94 on postage-free Reader Service card on p. 17 or 18



The Schaible Company, Cincinnati, Ohio, leading producer of plumbing and heating equipment, has standardized on Taylor Sillimanite #213 Ramming Mix for lining this battery of 17 #600-M Campbell-Hausfeld gas-fired crucible furnaces melting 700-pound heats—#275 crucibles. Tests have proved to Schaible that Taylor Sillimanite (TASIL) linings last longer, require less patching.

One TASIL rammed lining ran 2,051 heats of plumbing brass per lining. The average is approximately 1,750 heats. On a semi-continuous operation this means 1½ to 2½ years' service with a minimum of patching. This compares to 565 heats average for silicon carbide special shape linings with insulation backup. After considerable testing of other refractories, some cheaper, some more expensive, TASIL #213 Ramming Mix is the standard refractory lining.

TASIL works equally well in other types of crucible and barrel-type metal melting furnaces. Recommended for either gas or oil firing. Write for your free copy of Bulletin #315.

Exclusive Agents in Canada:
REFRACTORIES ENGINEERING AND SUPPLIES, LTD.
Hamilton and Montreal

The **CHAS. TAYLOR SONS Co.**
A SUBSIDIARY OF NATIONAL LEAD COMPANY
REFRACTORIES SINCE 1864 • CINCINNATI • OHIO • U.S.A.

For more facts, circle No. 102 on postage-free Reader Service card on p. 17 or 18

NOW...

The CONVENIENCE of 1
SOURCE OF SUPPLY PLUS
The DEPENDABILITY of 4
SOURCES OF SUPPLY
for ALL your foundry coke

There's a plant near you—

Semet-Solvay Division is the only merchant coke producer with four coke plants. And they are so strategically located that they can serve more than 82 per cent of the gray iron foundries in the United States and Canada. This means that one or more of our plants can conveniently serve you. Each is ready to supply all the high-quality foundry coke you need... when you need it! Yes, your coke supply is assured when you specify Semet-Solvay for...

Semet's new capacity is a record 3,750,000 tons per year!

Thanks to a new battery of 76 coke ovens at our Ashland, Kentucky, plant, Semet-Solvay goes even further out front as the largest producer of merchant coke in the country ...3¾ million tons per year! And, because Semet has no prior commitments with affiliated steel plants or public utilities, our foundry coke customers have first call on our output. You get the *kind* of coke you want when you specify Semet-Solvay because...

Your coke is sized to fit your cupola

You have your choice of 5 sizes when you "go Semet," for each of Semet-Solvay's four plants has the latest machinery for screening, for daily physical tests and chemical analyses. Our fifty years' experience in coke making and our complete control over all phases of coke production from mine to cupola mean that Semet-Solvay can assure you of properly sized foundry coke that is dependable in supply and consistent in quality. That is why *Semet-Solvay* foundry coke means "Better Melting."

Another Semet "plus"

FREE Metallurgical service

To give the specialized "outside" aid that often clears up trouble or variable results in a foundry, Semet-Solvay has available Foundry Metallurgists—practical foundrymen who are not only experts in the use of Semet-Solvay foundry coke in the cupola, but are qualified consultants in many phases of gray iron foundry operations.

Let them help you. There's no charge or obligation.

SEMET-SOLVAY DIVISION
Allied Chemical & Dye Corporation

40 Rector Street — Allied Chemical — New York 6, N. Y.

Cincinnati—723 Dixie Terminal Building, Cincinnati 2, Ohio **Cleveland**—2405 Terminal Tower Building, Cleveland 13, Ohio
Detroit—2532 Buhl Building, Detroit 26, Michigan **Buffalo**—602 Genesee Building, Buffalo 2, N. Y.
Toronto—25 King Street, Room 1317, Toronto 1, Ontario, Canada
Western Distributor: Wilson & Geo. Meyer & Co., 333 Montgomery St., San Francisco, Calif.

FOR **EASIER... BETTER**
SAND CONTROL
USE
DELTA
SCIENTIFICALLY DEVELOPED FOUNDRY PRODUCTS

DELTA PERMI-BOND
SEA COAL REPLACEMENT IN MOLDING SAND

DELTA PERMI-BOND is a revolutionary development which eliminates the use of SEA COAL . . . and its inherent disadvantages . . . in molding sands.

It is a specially prepared pure hydrocarbon, completely volatile at elevated temperatures. It decomposes to form a vapor-gas cushion, which is reducing in nature, and leaves only a trace (two-tenths of 1% maximum) of ash.

NOTE THESE IMPORTANT ADVANTAGES . . . 1. Always uniform. 2. Eliminates sand contamination. 3. Greatly reduces gas, smoke, soot and dirt in the foundry. 4. Provides correct amount of vapor gas in the mold cavity to prevent casting blows. Allows use of lower permeability sand. 5. Increases dry strength of sand 75% to 90%. 6. Prevents scabbing, buckling, rat-tailing and cutting which greatly reduces scrap castings. 7. Improves casting finish, cuts cleaning room costs to a minimum. 8. More economical to use; reduces your sand costs. 9. Much cleaner and more foolproof to use than sea coal.

DELTA DRI-BOND
IN CORE SAND

DELTA DRI-BOND BINDER is a product of several years of research and experimentation in our own sand research laboratory and proved by additional years of actual experience-in-use data compiled by prominent foundries. The excellent results obtained with Delta Dri-Bond Binder, reported by all sources, establish beyond question both the outstanding superiority and greater economy of this new product for use in steel, gray iron and non-ferrous foundries.

In recent tests, conducted by impartial personnel, it was definitely proved that Delta Dri-Bond Binder has (a) — higher tensile and compression strength, (b) — much greater waterproofing properties and (c) — considerably higher green strength and hot strength than other dry binders tested.

DELTA SAND CONDITIONING OILS
FOR CORE AND MOLDING SANDS

DELTA SAND CONDITIONING OIL is a very fluid organic liquid with a light greenish color cast. It has a very low surface tension and acts as a lubricant in sand mixes. It improves the flowability and workability of both molding and core sand mixes. Its greatest use is in core sand mixes where, in addition to improving the flowability of the sand, it helps eliminate sand sticking to the core boxes.

It has proven exceptionally useful in the elimination of core sand sticking problems in plastic resin core sand mixes.

DELTA

Get the Facts . . . Working samples and complete literature on Delta Foundry Products will be sent to you on request for test purposes in your own foundry.

DELTA OIL PRODUCTS CO.
MANUFACTURERS OF SCIENTIFICALLY CONTROLLED FOUNDRY PRODUCTS

MILWAUKEE 9, WISCONSIN

For more facts, circle No. 75 on postage-free Reader Service card on p. 17 or 18

Products & Processes

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Fill out postcards on pages 17-18 for complete information on items listed on pages 10-12-17-18-21-22

More data, information, prices can be obtained on all advertised and listed products, bulletins, services by using postage-free Reader Service card

Reinforced Grinding Wheels

Colonial reinforced wheels for high speed portable grinding are equipped with Grindway Safety Rings. Rings are made of a material which has a tensile strength greater than steel due to the hundreds of continuous minute glass filaments. *Colonial Abrasive Products Co.*

For more facts, circle No. 13 on card

Cylinder Mounting

New cylinder mounting consisting of sturdy, thick, square mounting lugs that mount flush with Miller's standard square heads and caps to provide a space-saving mounting of great strength and rigidity is designated as Model 77. It is for side or foot mounting. *Miller Fluid Power Co.*

For more facts, circle No. 19 on card

Direct Reading Spectrometer

A direct reading spectrometer has been modified to provide fast spectrochemical analysis on the foundry or metal fabricating floor. Known as the Spectromet, it was designed for the smaller plant or for an independent foundry operation in a larger installation. *Baird Associates, Inc.*

For more facts, circle No. 14 on card

Polishing Oils

Two new polishing oils for use in grinding and finishing ferrous and non-ferrous metals have been developed. Called Excelene FD for ferrous metals and Excelene NF for non-ferrous metals, the oils are applied to abrasive belts to reduce loading. *D. A. Stuart Oil Co.*

For more facts, circle No. 20 on card

Vacuum Melting Furnace

New vacuum melting and casting furnace suitable for moderate-size production of high-purity metals or for experimental and pilot-scale work has been developed. Known as Stokes Vacuum Furnace, Model 436, it has a melting capacity of 50 lb of steel or other metals. *Stokes Machine Co.*

For more facts, circle No. 15 on card

Break-Resistant Blade

A new break-resistant blade, the triple-reinforced Polk-A-Dot, has been introduced. Both sides of the blade are symetrically covered with raised abrasive "polkadots", each acting as an extra cutting edge. Dots reduce side-friction. *Clipper Manufacturing Co.*

For more facts, circle No. 16 on card

Safety Clip-On Glasses

New type of safety clip-on glasses, called Tuc-Over, provides shatterproof lenses in an unbreakable frame of tough, resilient polyethylene, so light it floats. They snap on or off prescription frames in a jiffy and are held firmly in place by plastic clips. *Watchemoket Optical Co.*

For more facts, circle No. 17 on card

Color Hardness Tester

The Color-Glance Brinell Hardness Tester has been developed. Three colored lights on the testing machine indicate the relative hardness of the parts being tested on a production basis. Unit is designed for minimum maintenance and simple operation. *Steel City Testing Machine, Inc.*

For more facts, circle No. 18 on card

Reader Service Dept. 5513

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First Class Permit No. 83, Sec. 34.9 P. L. & R. DES PLAINES, ILL.

Reader Service Dept.

AMERICAN FOUNDRYMAN

Golf & Wolf Roads

Des Plaines, Illinois

Free Foundry Information

Fill out postcards on pages 17-18 for complete information on items listed on pages 10-12-17-18-21-22

Cooling and Drying Fans

Folder V-50 describes the new Aerovent Vaneaxial Fans for cooling, drying, exhausting, fume dispersal and heat transfer. Fans utilize specially constructed propellers and guide vanes to provide high-velocity, straight-line air delivery. *Aerovent Fan Co., Inc.*

For more facts, circle No. 21 on card

Sand Control

Volclay Bentonite News Letter No. 37 points out that many believe that the real value of venting is not to relieve steam pressure but to punch the molding sand with vent holes that best allow the sand to expand more freely. Thus, fewer scabs and buckles occur. *American Colloid Co.*

For more facts, circle No. 23 on card

Core Blowers

Data is available pointing out how Champion Flexibloo in a magnesium foundry meant real savings on small and medium size cores. In producing precision magnesium aircraft castings the foundry depends on Champion Flexible Core Blowers and Speedmullors. *Beardsley & Piper.*

For more facts, circle No. 25 on card

Dielectric Core Dryer

Bulletin 15B7306B describes the Foundromatic dryer and gives the facts on dielectric core drying, plus the operational convenience and simplicity of Tell-All Control. Tells how electrode control permits adjusting to the physical variances of cores. *Allis-Chalmers Mfg. Co.*

For more facts, circle No. 22 on card

Steel Shot Abrasives

Bulletin 89B tells how to obtain the lowest possible overall cleaning costs by using Wheelabrator Steel Shot for all blast cleaning operations. Tells how one company slashed costs 80 per cent and reduced machine maintenance costs. *American Wheelabrator & Equipment Corp.*

For more facts, circle No. 24 on card

Pattern Work Facilities

Colorful new brochure is now available which details the complete facilities for pattern work, foundry work and precision machining. Each department is completely illustrated with over 40 recent illustrations. Tells how facilities can serve you. *City Pattern Foundry & Machine Co.*

For more facts, circle No. 26 on card

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Reader Service Dept.

AMERICAN FOUNDRYMAN

Golf & Wolf Roads

Des Plaines, Illinois

Metallic Abrasives

Catalog No. 1153 points out how 20th Century Normalized will meet all requirements and give greater production efficience and economy. Describes how Normalized is a tough long-wearing abrasive that has uniformity and quality. *The Cleveland Metal Company.*

For more facts, circle No. 27 on card

Perforated Chaplets

Catalog tells how Fanner Perforated Chaplets are ideally suited to a wide variety of applications where there is no need for heavy core support. Illustrates a wide range of thicknesses and sizes. Claim shape can be designed to fit almost any contour. *Fanner Mfg. Co.*

For more facts, circle No. 28 on card

Molding Sand Additives

Bulletin, *"Taylor-Made Molding Sands"*, tells how Federal's Crown Hill Seacoal, Green Bond Bentonite and Federal Sand Stabilizer are three sand additives that will simplify sand control and provide uniform, thoroughly satisfactory results. *Federal Foundry Supply Co.*

For more facts, circle No. 29 on card

Shell Molding Manual

How can shell molding help you? General Electric, a supplier of molding and release agents for the shell process has prepared an informative 28-page manual, now available, telling about the techniques and benefits of this new foundry method. *General Electric Co.*

For more facts, circle No. 30 on card

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Reader Service Dept. **55|3**

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106							

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COMPANY

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CITY AND ZONE

KORBOND
Core Oil
№ 861-A

Steel is the measure of our strength as a nation, the source material for armaments and the key to our industrial expansion.

Castings made from steel are doing a job thought impossible a few years ago and all this with the help of United's Core Binders. Finer castings in steel and alloy are being produced every day with Korbond and Top-bond.

KORBOND CORE OILS have done a job for the most delicate Monel Castings and for huge castings in steel that weigh-in at 80 tons, — water wheels for our hydro-electric plants.

TOP-BOND is a companion product — a spray for green sand cores and molds which builds up surface hardness and protects firm sharp edges from rubbing. Top-bond will air dry, leaving a bonding resin that really ties down every grain of sand. It will help produce clean smooth castings and save endless expense in the cleaning room.

Fifteen of these segment cores weighing 7 tons each and made with Korbond Core Oil are used by the Erie Forge and Steel Company in pouring one 80 ton steel runner.

We will be glad to send bulletins that describe Korbond Core Oils in more detail and explain how Top-bond can pay its own way as an aid to finer castings.

UNITED OIL MFG. COMPANY
1429 WALNUT STREET, ERIE, PA.

Only COLEMAN TOWER® OVENS
provide all these major advantages

INCREASE PRODUCTIVITY

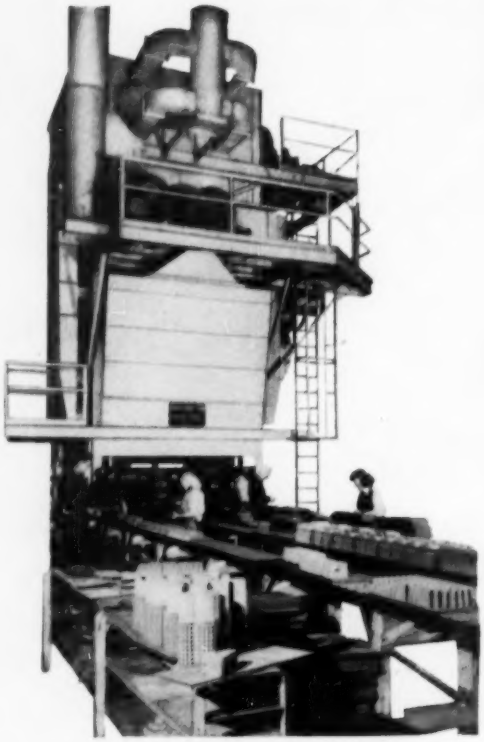
Savings through consistent, dependable production of perfectly baked cores; eliminating rejects, makeovers and casting losses due to improper core baking.

SAVE SPACE

Vertical design permits saving of approximately 75% of floor space over batch ovens of the same capacity. Cores are "smoked-off" and cooled before leaving unloading station.

REDUCE MAINTENANCE

Heavy duty construction for continuous, dependable performance and economical operation reduces maintenance cost to a minimum.



Coleman Tower ovens use only 25% of floor space required by batch type ovens of same capacity.

SAVE TIME

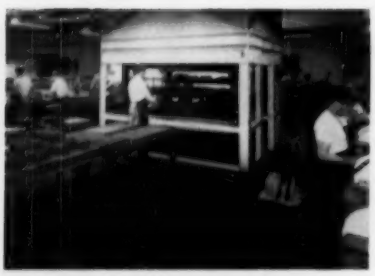
Cores of widely different sizes and shapes can be handled at the same time, all baked with consistent uniformity. Trucks, racks and money-wasting handling methods are eliminated.

SAVE BINDER

Proper core baking atmosphere and uniform temperature provide sizeable savings in conventional or high speed binders.

SAVE FUEL

The recovered heat is used over again, thus yielding important fuel saving. The most economical fuel available to you can be conveniently used.



Patented Open Center permits close, efficient grouping of coremakers around the oven... results in increased coremaker productivity.

3-way loading feature increases accessibility 300% over ordinary vertical oven designs.

Recuperative cooling system "smokes-off" and cools the cores before they reach unload station.

Coleman Tower Ovens are the most widely used continuous core baking ovens in the foundry industry. They have brought the advantages of mechanization to large and small foundries and have made important cost reductions. Why not find out whether Coleman Tower Ovens can bring the same savings to you? Our engineers are available without obligation to make practical recommendations for your particular requirements... call or write today!

WRITE FOR BULLETIN 54

A COMPLETE RANGE OF TYPES AND SIZES

for every core baking and mold drying requirement:

Tower Ovens • Horizontal Conveyor Ovens
Car-Type Core Ovens • Car-Type Mold Ovens
Transrack Ovens • Rolling Drawer Ovens
Portable Core Ovens • Portable Mold Dryers
Dielectric Core Ovens

THE FOUNDRY EQUIPMENT COMPANY
1821 COLUMBUS ROAD **CLEVELAND 13, OHIO**

WORLD'S OLDEST AND LARGEST FOUNDRY OVEN SPECIALISTS

For more facts, circle No. 79 on postage-free Reader Service card on p. 17 or 18

Free Foundry Information

continued from page 18

Fill out postcards on pages 17-18 for complete information on items listed on pages 10-12-17-18-21-22

Core or Mold Machine

Bulletin AN describes the International Type AN Machine for short runs. Unit is designed for job or production work in any foundry. It is flexible—for either cores or molds. Can be made in any size. Turn-over capacity of 1500 to 10,000 lb. *International Molding Machine Co.*

For more facts, circle No. 31 on p. 18

Core Oil

Technical data regarding core oil used in present or future casting operations is now available. Advantages listed are: dependable uniformity, concentrated form, no obnoxious odor, seepage eliminated, wide temperature range, polymerized formulation and minimum gas. *Penola Oil Co.*

For more facts, circle No. 37 on p. 18

Aluminum Coating

Descriptive literature is available which points out that the outstanding advantage of the Alumicoat Process lies in the fact that pure aluminum can be used since alloying is not necessary to secure mechanical strength. Photos illustrate process. *Arthur Tickle Engineering Works, Inc.*

For more facts, circle No. 42 on p. 18

Portable Hardness Testers

Literature is available describing the King Portable Brinell Hardness Tester. Advantages listed are: it puts an actual load of 3000 kg on a 10 mm ball; can be used in any position—even upside down, and is equally accurate as portable or stationary equipment. *Andrew King.*

For more facts, circle No. 32 on p. 18

Aluminum Alloy

Bulletin No. 103 (Rev. 2) gives updated natural aging curves for Tenzaloy, a high strength aluminum casting alloy. Sixteen special features and characteristics about Tenzaloy of interest to designers, product engineers, foundrymen and finishers are noted. *Federated Metals Div.*

For more facts, circle No. 38 on p. 18

Band Wheel Catalog

New abrasive band wheel catalog shows wide range of sizes and lists prices for over 50 standard sized wheels and matching abrasive bands in grits from 24 to 400. Photographs portray band wheels being used for patternmaking and deburring. *Even-Cut Abrasive Band Co.*

For more facts, circle No. 43 on p. 18

Conveying Equipment

Book 2423 is helpful when a castings or sand handling or preparation problem occurs. Book shows Link-Belt's complete line of modern equipment for ferrous and non-ferrous foundries. Also includes seven tested layouts showing mechanization. *Link Belt Co.*

For more facts, circle No. 33 on p. 18

FREE TEAR SHEETS

of all AMERICAN FOUNDRYMAN articles are available on request. Keep your magazine intact and pass it on for others to use. For free tear sheets, write to Editor, AMERICAN FOUNDRYMAN, Golf & Wolf Roads, Des Plaines, Ill. Please show company connection and your title on tear sheet request.

Electronic Core Baking

Booklet describing Thermex Electronic Core Baking Equipment is now available. Lists the most frequent questions asked about electronic baking and gives the answers. Discusses plastic driers for the foundry industry. Also includes specifications and diagrams. *The Girdler Co.*

For more facts, circle No. 44 on p. 18

Enclosed-Tip Thermocouples

Descriptive literature is available describing Marshall Enclosed-Tip Thermocouples as an aid in making the best castings of brass, aluminum or magnesium, (or alloys). Thermocouples are a tool that enables the foundryman to check the heat of molten metal. *L. H. Marshall Co.*

For more facts, circle No. 34 on p. 18

Arc Furnace Electrodes

Bulletin No. 162 describes the Askania system of hydraulically positioning arc furnace electrodes. Electrodes react instantaneously and smoothly to an electrical signal proportional to arc impedance. Photos and diagrams are included. *Askania Regulator Co.*

For more facts, circle No. 39 on p. 18

Plaster Mold Castings

"How Plaster Mold Castings Pare Your Costs" is the title of a 12-page, pocket sized, illustrated booklet now available. Explains how parts in limited runs or pilot runs are produced in plaster molds to achieve precision castings at low cost. *Hale Foundry Co.*

For more facts, circle No. 45 on p. 18

Core Sand

Literature listing proper core sand recommendations is now available. Points out how a constant AFS grain analysis of 40,44,49, 52 and 55 is maintained through continuous testing with up-to-date laboratory methods. This means less core breakage. *Nugent Sand Co.*

For more facts, circle No. 35 on p. 18

Hose Check List

Hose check list to obtain longer hose life and better performance is now available. Printed in black on a yellow background for easy reading, the 11-point check list high-lights four common abuses of hose with drawing. Chart size is 8½ x 11 in. *Thermoid Co.*

For more facts, circle No. 40 on p. 18

Aluminum Alloy Specifications

New specifications sheet detailing the physical and chemical properties of Titanite, a high-strength aluminum alloy used for making castings with properties that compare with heat treated castings, is now available. *Aluminum Smelting & Refining Co.*

For more facts, circle No. 46 on p. 18

Band Saw

Bulletin No. 116-DH tells how the Oliver Band Saw takes 35 in. under guide to saw extra large patterns. Has 36 in. diameter wheels. Cuts true and steady without vibration at all speeds. Gives clearance for sawing large patterns, jigs and fixtures. *Oliver Machinery Co.*

For more facts, circle No. 36 on p. 18

Automation Dictionary

Automation Dictionary covers some 87 words and phrases, all of which had their origin with the engineers but are now creeping into the lexicon of today's modern businessman. Booklet explains words and phrases in layman-like definitions. *Minneapolis-Honeywell Regulator Co.*

For more facts, circle No. 41 on p. 18

Liquid Core Paste

Folder describing Lyquagrip, a liquid core paste, is now available. Tells how paste is odorless, light in color, non-fermenting, non-corrosive, resists moisture, and fast drying and quick initial set. Cores can be returned to oven as paste withstands oven temperatures. *Whitehead Bros. Co.*

For more facts, circle No. 47 on p. 18

continued on page 22

Free Foundry Information

continued from page 21

Fill out postcards on pages 17-18 for complete information on items listed on pages 10-12-17-18-21-22

Space Heaters

A brochure of engineering case studies, now available, describes eight metalworking applications where warm air space heaters were used to temper large volumes of fresh make-up air for plant ventilation. Substances originated in pickling, painting and hot galvanizing areas. *Dravo Corp.*

For more facts, circle No. 48 on p. 18

Resin Catalog

Shell Mold Resin Catalog, divided into three sections: general information, shell molding and data sheets, is now available. Shell molding is explained and the advantages of the process such as closer tolerances and increased production are pointed out. *Schenectady Varnish Co.*

For more facts, circle No. 54 on p. 18

Hand Geared Cranes

Bulletin HG-948 describes the single girder hand geared underhung cranes and hand geared top running cranes. Photos show actual installations. Also illustrated are, jib, push type, motor driven double girder and gantry cranes. *Industrial Crane & Hoist Corp.*

For more facts, circle No. 58 on p. 18

Graphite in Electrometallurgy

Booklet, *"Engineered Performance,"* tells how advanced process technology assures dependability and uniformity of GLC electrodes, anodes, mold stock and graphite specialties. Outlines some reasons why the Electrode Div. has made such steady progress. *Great Lakes Carbon Corp.*

For more facts, circle No. 49 on p. 18

Refractories Properties

New 24-page booklet gives the latest physical and chemical properties on super refractories by Carborundum. Data are assembled in easy to find style and are augmented by lists of applications together with pertinent charts and tables. *The Carborundum Company.*

For more facts, circle No. 50 on p. 18

Reprints and Bibliographies

Reprints and bibliographies listed below have been made available by the AFS Technical Dept. or by AMERICAN FOUNDRYMAN. Ask for them by giving code designation on dotted line of postpaid Reader Service Card, pages 17-18.

RB1 . . *"Casting Design"*
RB2 . . *"Gating and Risering"*
RB3 . . *"AFS Research"* (lists 58 papers)
RB4 . . *"Nondestructive Testing"*
RB5 . . *"Machinability"*
RB6 . . *"Casting Defects"*
RB7 . . *"Foundry Layouts"*
RB8 . . *"Shell Molding"*

Parting Compound

Illustrated Bulletin No. 427 discusses the use of 'dag' Colloidal Graphite as a parting compound. Specific 'dag' dispersions for many industrial uses, and techniques of application including the new stencil pattern application, are presented. *Acheson Colloids Co.*

For more facts, circle No. 59 on p. 18

Abrasive Grains and Powders

Booklet No. 14 contains informative charts and illustrations on abrasive grain and powders for use in metal finishing. Includes many of Carborundum's latest abrasive engineering recommendations. Contains suggested layout for set-up room and curing room. *Carborundum Co.*

For more facts, circle No. 60 on p. 18

Cadmium Electroplating

Bulletin P-131 describes an improved process for electroplating of cadmium. Stevco Bright Cadmium Process was designed to supply demands for a bright cadmium deposit to meet definite thickness of deposit and corrosion protection specifications. *Frederic B. Stevens.*

For more facts, circle No. 51 on p. 18

Foundry Ovens

Bulletin No. 1152 describes Moco Foundry Ovens with maximum air recirculation horizontally. Shows photos and gives explanations of car or rack ovens, conveyor core ovens and roller drawer ovens. Lists eight advantages that are engineered into the ovens. *Michigan Oven Co.*

For more facts, circle No. 55 on p. 18

Combustion Tubes

Leaflet discusses laboratory combustion tubes, boats and shields. Points out their high refractory value, resistance to slag attack and variety of shapes and sizes available. Catalog listings and sizes and prices are also included in the booklet. *Harry W. Dietert Co.*

For more facts, circle No. 61 on p. 18

Lift Truck Operation

Form 1214, *"How to Operate a Lift Truck,"* is prepared for use as part of an operator training program. It is slanted for both the beginner and the experienced operator. Contains information about the operation of a lift truck, preventive maintenance and safety. *Hyster Co.*

For more facts, circle No. 52 on p. 18

Dust Collecting System

Booklet is available showing drawing and diagram of a typical Schneible dust collecting and ventilating system for mold conveyor unit. Explanation and drawing of typical equipment in the casting cleaning room is also included. *Claude B. Schneible Co.*

For more facts, circle No. 56 on p. 18

Blasting Machine

Bulletin No. 124-B describes the 48 x 42 in. Wheelabrator Tumblast, an airless blast cleaning machine employing the tumbling principle in conjunction with the hurling of metallic or non-metallic abrasives. *American Wheelabrator & Equipment Corp.*

For more facts, circle No. 62 on p. 18

Safety Equipment Catalog

Bullard No. 55 Catalog, a new safety equipment booklet, is now available. Information on all Bullard Safety Products is given in a quick and efficient manner. Photos of all items explained are shown with easy-to-read technical data. *E. D. Bullard Co.*

For more facts, circle No. 53 on p. 18

Core Sand

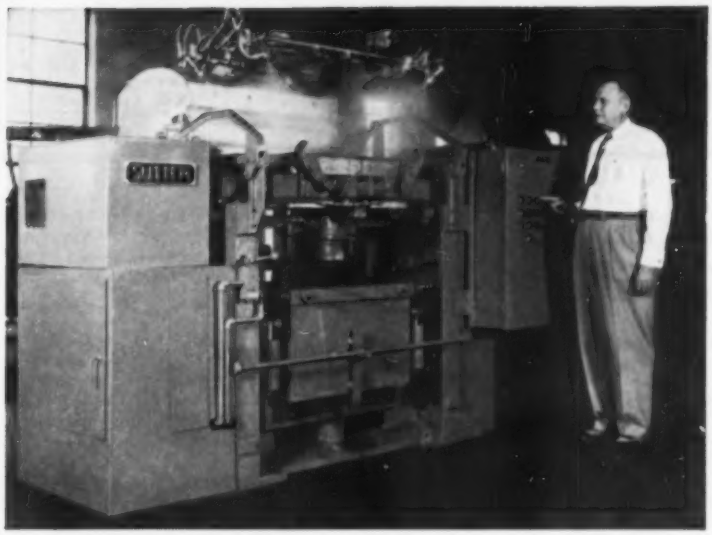
Booklet, *"Sands, Moisture, Binders—How Do They Affect Foundry Cores,"* is now available. It is a condensation of several research reports covering these factors. Points out how any core property can be changed by using different types of sand. *Archer-Daniels-Midland Co.*

For more facts, circle No. 57 on p. 18

Aluminum Alloys Handbook

New illustrated two-color 60-page "Aluminum Casting Alloys Handbook" has just been published. In addition to descriptive material on metallurgy and casting practices, it consolidates all important specifications pertaining to aluminum casting alloys. *American Smelting & Refining Co.*

For more facts, circle No. 63 on p. 18



Mr. Ray Sutter at the single-station control panel of the shell molding machine made by Sutter Products, Dearborn, Michigan. The Sutter was one of the first machines to provide a completely automatic molding cycle including closely controlled coating, temperature and curing time. Maximum shell capacity is 20" x 30" x 6"; production rate 45 to 60 shells per hour. Gasfired; electric curing oven optional.

SPEED SHELL MOLDING WITH DOW CORNING 8 EMULSION

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You can rely on Dow Corning 8 Emulsion to deliver finished shells promptly, easily and economically. Especially designed for the shell process, this silicone parting agent can't break down at operating temperatures to form a carbonaceous deposit on pattern surfaces. Cleaning costs are minimized, and you increase production of shells with consistently high dimensional accuracy. For more information and a free trial sample, return the coupon today.

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FORD MOTOR USES SILICONE GREASE IN CORE OVEN CONVEYOR BEARINGS

With peak temperatures reaching 700 F, the six core oven conveyors at the River Rouge foundry of Ford Motor Company operate 16 hours a day, five days a week. Each system has 4 six-inch roller bearings mounted in the oven and 1200 trolley bearings that are exposed to oven temperatures an average of 2½ out of every 4 operating hours.

That's rough treatment for any bearing. Despite continuous lubrication and frequent cleaning, no conventional organic lubricant was able to prevent repeated work stoppages. Trolley bearings froze; rolling surfaces were flattened.

In 1948, after several successful test runs, Ford changed over to Dow Corning 41 Grease in all 7224 trolley and roller bearings. Power required to move the conveyors dropped 80%. The relubrication schedule for trolley bearings was reduced to once a week; once a month for the roller bearings. Labor, replacement and maintenance costs have been cut to a fraction of their former level.

Ford's experience is typical of the reports received from hundreds of plants now using Dow Corning 41 Grease in low-speed, antifriction bearings exposed to high operating temperatures. Data and performance as proved by many case histories are given in a new brochure on this remarkably heat-stable and versatile silicone lubricant. For your free copy of this brochure, call our nearest branch office or,

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* Ottawa Blackhawk Silica
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Silka Molding
* Zircon Sand, Flour and Wash
Berlin Coresand
Red Flint Annealing
New Jersey Molding
Gallia Red Molding
Albany Molding

BONDING CLAYS
* Volclay, MX-80 (Granular)
* and Panther Creek Bentonite
* Goose Lake Fire Clay
* Grundite Bonding Clay

ABRASIVES
Tru-Steel Steel Shot
* Malleabrasive Shot and Grit
* Certified Shot and Grit
* Blackhawk Sand Blast Sand
* Super-Titan Nozzles

REFRACTORIES & MISC.
Cargon Cupola Gun Mix
Firegan Ganister
* Microsil Silica Flour
Fluxing Limestone
* Five Star Wood Flour
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For more facts, circle No. 70 on p. 17-18

Letters to the Editor

Letters should be addressed to *American Foundryman*, Golf & Wolf Roads, Des Plaines, Ill. Letters must be signed but will be published without signature on request.

Now He Gets It

Until recently I didn't receive AMERICAN FOUNDRYMAN as so many of the fellows in the plant do. Instead, I "borrowed" one of the shop copies and took it home where I could study it quietly, away from the press of production. Now I receive my own copy at home, and the shop again has an extra copy for others to read.

NAME WITHHELD

Tear Sheets Gladly Sent

We would appreciate receiving ten tear sheets of the article *"Melting and Pouring Bronze"* by A. E. Cartwright which appeared in the January 1955 issue (pages 50-56). This article was very stimulating and will be an excellent addition to our Technical Library.

T. S. GAMBLE
Asst. to General Sales Manager
National Carbon Co.
Toronto, Canada

Please send me the tear sheets on *"Malleable Gating"* by Lawrence Winnings, starting on page 35 of the January 1955 issue of AMERICAN FOUNDRYMAN.

WILLIAM J. DELL, *Metallurgist*
Arcade Malleable Iron Co.
Worcester, Mass.

Please send me two tear-sheet copies of *"Mechanised Shell Molding"* by F. Eugene Murphy. The article appeared on pages 42-45 of the January 1955 issue of AMERICAN FOUNDRYMAN.

D. J. KOCH, *Plant Engineer*
Sivyer Steel Casting Co.
Milwaukee, Wis.

I will appreciate very much your sending me tear sheets of the following articles which appear in the January 1955 issue: *"Cooling Castings After Shakeout"* by T. J. Glaza (pages 46-47) and *"Sand Reclamation Unit Cuts Costs"* by Hubert Chappie (pages 48-49).

FRED B. HENRY, *Sales Mgr.*
Jeffrey Mfg. Co.
Columbus, Ohio

Would appreciate receiving articles entitled *"Holding Blast Humidity Constant"* and *"How to Prevent Copper-Base Alloy Casting Defects."*

F. J. GEDEMER, *Engineer*
Nekoosa Foundry & Machine Works
Nekoosa, Wis.

Please forward two sets of Foundry Facts tear sheets relating to *"Copper-Base Casting Defects."* The article appears in the December issue on pages 61-63.

G. C. NASH
Proof Co.
Goshen, Ind.

We would like to obtain tear sheets of the article appearing on pages 138-143 in the May 1954 issue of the AMERICAN FOUNDRYMAN entitled *"Developments in Shell Molding"* by E. I. Valyi.

C. L. CARTER, *Pres.*
Albion Malleable Iron Co.
Albion, Mich.

We would like a copy of the article *"How to Design an Exhaust System"* by W. W. Dodge appearing on pages 50-55 of the August 1954 issue of AMERICAN FOUNDRYMAN.

R. O. WIGGER
Lewis-Mathes Co.
East St. Louis, Ill.

We should be glad if you could send us a copy of the following articles appearing in the November 1954 issue of AMERICAN FOUNDRYMAN: *"Effect of Coke Size on Cupola Melting"* by W. W. Holden (pages 38-40) and *"Recommended Minimum Standard for Commercial Carbon Steel Castings"* (pages 65-66).

WM. E. FULLER, *Information Officer*
British Steel Castings Research Assoc.
Sheffield, England

Please send us a copy of the article *"Melting and Pouring Bronze"* (pages 50-56) by A. E. Cartwright as it appeared in the January 1955 copy of AMERICAN FOUNDRYMAN.

EDWARD S. ADLER
Canton Products
Canton, Ohio

We would appreciate receipt of two reprints of the article entitled *"How to Prevent Copper-Base Alloy Casting Defects"* which appeared on pages 61 through 63 in the December 1954 issue of AMERICAN FOUNDRYMAN.

WILLIAM L. MACKIE
U. S. Naval Air Missile Test Center
Point Mugu, Calif.

We would appreciate your sending us a copy of the article by W. A. Spindler, W. B. Pierce and R. A. Flinn *"Revised Spiral Test Relates Fluidity to Phase Diagram"* (pages 56-58), which appears in the September 1954 issue of AMERICAN FOUNDRYMAN.

H. F. KELLER, JR., *Met. Eng.*
American Radiator & Standard Sanitary Corp.
Louisville, Ky.

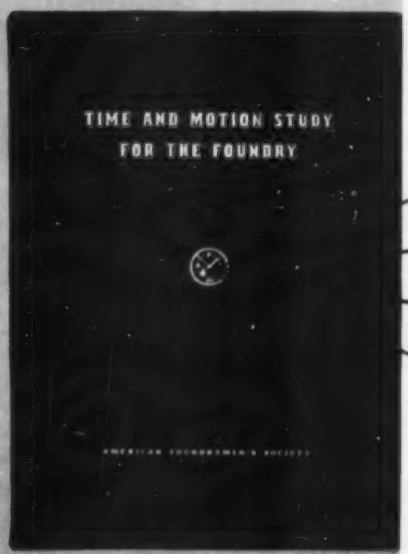
A STRAIGHT LINE

is the shortest route between two points

Raw Material Stage — **Management Planning Time** — **Finished Product Delivery**

. . . and the most logical reason why this new American Foundrymen's Society publication —TIME AND MOTION STUDY FOR THE FOUNDRY— is such a vital help to foundry management.

Actually, this book is a symposium of carefully selected articles that provide practical foundrymen with the "shortest route" to . . .



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TIME AND MOTION STUDY FOR THE FOUNDRY is a casebound, 8½ x 11-inch book, totaling over 165 pages. It is a collection of material that is invaluable as a guide to small managements seeking guide posts for a standards department . . . to standards departments seeking to compare and evaluate their efforts with a correlation of workable procedure and proven experience . . . to management, for widening their horizons of accomplishment through motion and time study performance.

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Foundrymen in the News

P. E. Cavanagh has been named director of the Department of Engineering and Metallurgy, Ontario Research Foundation succeeding **O. W. Ellis,** who has recently retired. After receiving his B.A.Sc. in metallurgical engineering from the University of Toronto, Mr. Cavanagh was employed by the Ontario Research Foundation until 1939 when he was employed in the Metallurgy and Open Hearth Departments of Steel Company of Canada. From 1943 to 1946 he was employed in part by Allen B. DuMont Laboratories, Inc. as chief metallurgist and in part by Allen B. DuMont Laboratories at the Ontario Research Foundation. Previous to his present position, Mr. Cavanagh was assistant director.

Mr. Ellis was born at Swindon, England, and received his technical training at the University of Birmingham, Birmingham, England. He served a railroad apprenticeship with the Great Western Railway at Swindon and taught metallurgical engineering at the University of Toronto. In addition, he conducted research at Mellon Institute, Pittsburgh, Pa., and was a research metallurgist with Westinghouse Electric & Mfg. Co., East Pittsburgh. He was the director of the Department of Engineering and Metallurgy, Ontario Research Foundation, from 1929 until his retirement the end of 1954.

Ted Operhall has been elected president of Misco Precision Casting Co. Mr. Operhall is also president of the Investment Casting Institute.

Robert D. Barron has been appointed manager of National Plant, National Radiator Co., Johnstown, Pa. He succeeds **John E. Harris,** who has been named manager of engineering at the company's Viking Air Conditioning Div., Cleveland.

H. L. Boynon, W. W. Cockrill, O. H. Read, and **C. H. Coats** have been appointed assistant general sales managers, and **W. K. Stevens** has been named sales manager of the Woodbridge Div.

H. E. Ehlers, Jr., has been promoted to the post of general sales manager for Joseph Dixon Crucible Co., Jersey City. **R. C. Brock** was promoted to industrial sales manager, and **D. C. McMillin** was promoted to district manager, Pacific Coast District.

William E. Jones has been appointed works manager of Josam Manufacturing Co., Michigan City, Ind. He will be responsible for operating the foundry and machine shop in addition to other departments.

Albert P. Gagnebin has been appointed assistant manager of the Nickel Sales Department, International Nickel Co., Inc.

Edward B. Bitzer was appointed assistant manager of the Nickel Alloys Department, and **Keith D. Millis** has been placed in charge of the Ductile Iron Section of the Development and Research Div.

Fred B. Riggan, former vice-president in charge of research and development for Key Company, East St. Louis, Ill., and consultant to the steel foundry industry, has joined Texas Steel Co. of Fort Worth, Texas, as chief metallurgist.

Norman N. Breyer, formerly chief of the Armor Section, Detroit Arsenal, has joined Continental Foundry & Machine Co., East Chicago, Ind., as metallurgist for the Armor Div.

Dr. R. J. Sarjant has been appointed director of research of the British Steel Castings Research Association. **Dr. A. H. Sully** has been appointed associate director of research.

Joseph P. Bradshaw has been named a district sales manager in the Western Region for Industrial Truck Div., Clark Equipment Co.

Howard N. Farmer, Jr., has joined the Development and Research Div., International Nickel Co., Inc., as a member of the West Coast Technical Field Section at Los Angeles.

continued on page 28

H. E. Ehlers, Jr. . . . promoted

A. P. Gagnebin . . . asst. mgr.

K. D. Millis . . . in charge

P. E. Cavanagh . . . director

T. Operhall . . . president

W. E. Jones . . . works mgr.

R. D. Barron . . . manager

FRANKLY SPEAKING...

--can you afford not to belong?--

LET'S FACE THE FACT . . . in the Gray Iron industry, you are in a highly competitive business. You are in competition with other materials and methods . . . in competition with other foundries.

LET'S FACE THE FACT . . . who wins in a competitive situation? It's usually the man, or foundry, or material that can do the best job for the customer . . . in quality, in performance, in cost.

LET'S FACE THE FACT . . . you can't stand still in a competitive situation. You've got to keep up with your own industry. You've got to keep ahead of competitive materials and methods. Static thinking or static technology soon leaves you or your company with a static or declining backlog and profit margin.

LET'S FACE THE FACT . . . throughout the Gray Iron industry there are changes occurring constantly . . . in techniques and in business procedures. In your local marketing area, you are probably aware of these factors. But can you keep up with the entire industry?

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H. E. Ladwig . . . consultant

A. Lebesch . . . foundry mgr.

A. J. Fruchtl . . . honored

P. F. Thayer . . . vice-pres.

continued from page 26

Harry E. Ladwig has been named foundry consultant to the West Allis Works of Allis-Chalmers Manufacturing Co. Replacing him as works manager of foundries and pattern shops is **Anthony Lebesch.** Mr. Ladwig is a past president of the Wisconsin Chapter of AFS.

Philip F. Thayer has been appointed vice president of General Metals Corp. and general manager of its Metals Div. operating foundries, forge, and pipe fittings plants in Oakland, Los Angeles, and Houston.

A. J. Fruchtl, resident manager, United States Pipe and Foundry Co., Birmingham, Ala., has been appointed to the Administrative Council of National Foundry Association. Mr. Fruchtl is the vice-chairman of the Birmingham District Chapter of American Foundrymen's Society.

Chester R. Zalewski has been elected a vice-president and director of Buffalo Pipe & Foundry Corp., Buffalo, N. Y. **Patrick A. Higgins** has been elected secretary and a director, **Thomas B. Healy, Jr.,** has been elected assistant treasurer, assistant secretary and a director, and **Milton D. Emery** has been elected production manager.

Dr. Kurt C. Frisch has been appointed assistant manager of research at E. F. Houghton & Co., Philadelphia.

Walter W. Walb has been elected president of Power Crane and Shovel Association. **D. W. Lehti,** Link-Belt Speeder Corp., has been elected vice-president, and **Herbert S. Blake, Jr.,** has been elected secretary and counsel.

Willard M. Mobley has been appointed technical director of Alabama By-Products Corp., Birmingham, Ala. Mr. Mobley will head the company's new Technical Control and Research Dept.

Henry A. Fleer has been appointed to the sales staff of Syntron Chicago Sales Co. Mr. Fleer will be located in the Chicago office, and his territory will include Chicago's metropolitan area.

Dr. S. S. Kistler has been appointed director of research, Sterling Grinding Wheel Co., Tiffin, Ohio, and Peninsular Grinding Wheel Div. of Abrasive and Metal Products Co., Detroit, Mich. **Dr. W. R. Morgan,** in addition to his post of manager of vitrified for Peninsular, will fill the position of director of manufacturing for both organizations. **William H. Fellows** will be director of sales for both Sterling Grinding Wheel Co. and Peninsular Grinding Wheel Div.

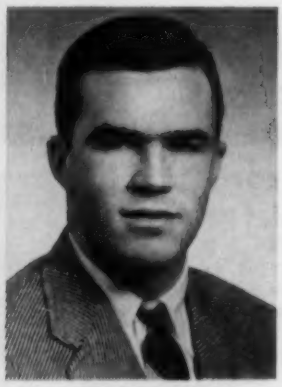
A. C. Denison has been appointed chairman of the board, Fulton Foundry & Machine Co., Inc., Cleveland, and Mr. **Frank L. Barton** has been appointed president of the company.

A. C. Denison . . . chairman

F. L. Barton . . . president

C. R. Zalewski . . . vice-pres.

P. A. Higgins . . . secretary



T. B. Healy, Jr., . . . asst. treas.

M. D. Emery . . . prod. mgr.

don't trust to luck...

when you can be sure with CUT STEEL!

Don't buy conventional types of abrasives and trust to luck to get exceptional cleaning results. For there's a revolutionary, new type of abrasive—CUT STEEL—that cleans like no other abrasive has ever cleaned! It isn't air-formed, cast or made from wire. Instead, it's cut from high quality, alloy steel. And, it does an incredibly fine job of cleaning!

CUT STEEL gives castings and forgings a gleaming, natural metallic appearance. Cleans up to twice as fast as other abrasives. Outlasts other abrasives. Holds maintenance costs to a minimum. Yet, Grade "A" CUT STEEL *sells for less than most cast steel shot* and Grade "B" *costs no more than most malleable shot!*

So, don't trust to luck—change over to CUT STEEL and be sure of better, more economical cleaning. Send for samples, prices or a trial order—TODAY!

Sooner or later, you too, will change to CUT STEEL!

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ABRASIVE

ANNEALSHOT and SUPER-ANNEALSHOT

PRODUCTS OF

METAL BLAST, INC.

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In its original form CUT STEEL resembles steel grit, with sharp edges and corners.

In usage it rapidly changes to a spherical shape, in a wide variety of sizes.

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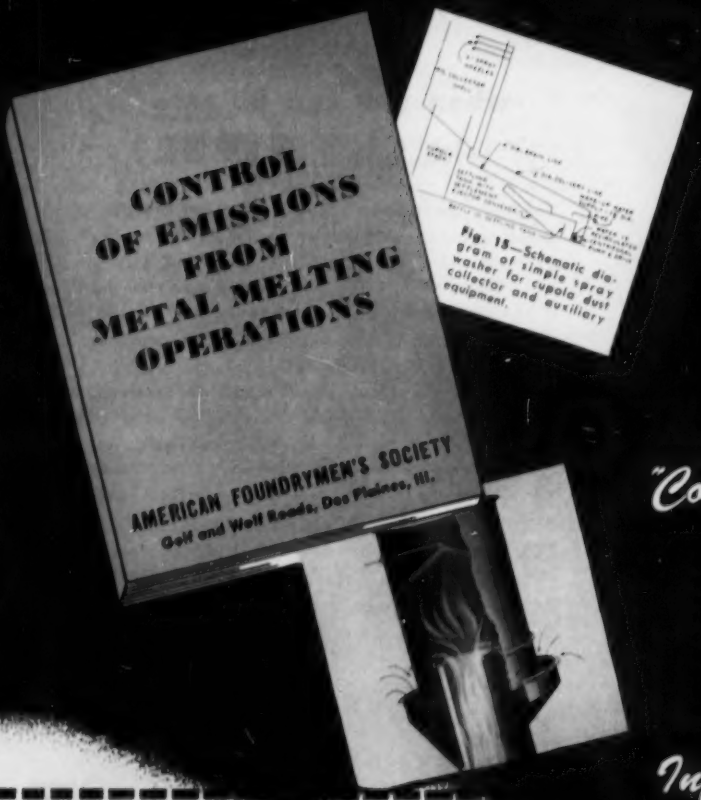

Fig. 18—Schematic diagram of simple spray washer for cupola dust collector and auxiliary equipment.

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Information...

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You can double core production

yet cut core costs with

FOUNDREZ 7101

● When you switch from ordinary core oils to RCI's FOUNDREZ 7101 you can actually double your production of cores, at the same time *reducing* their cost per ton.

FOUNDREZ 7101 is a water dispersing, phenol-formaldehyde binder that enables you to bake cores in just about half the time of oil-bonded cores — without the addition of any extra oven equipment.

What's more, you get a superior core. Tensile strength and hardness are greater. Permeability is increased. Gassing is reduced. Hot strength is higher. Less cereal binder is needed. And shake-out is better, saving time and material in cleaning finished castings.

Get the full facts on FOUNDREZ 7101 by writing for Technical Bulletin F-1.

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Synthetic Resins • Chemical Colors • Industrial Adhesives • Plasticizers
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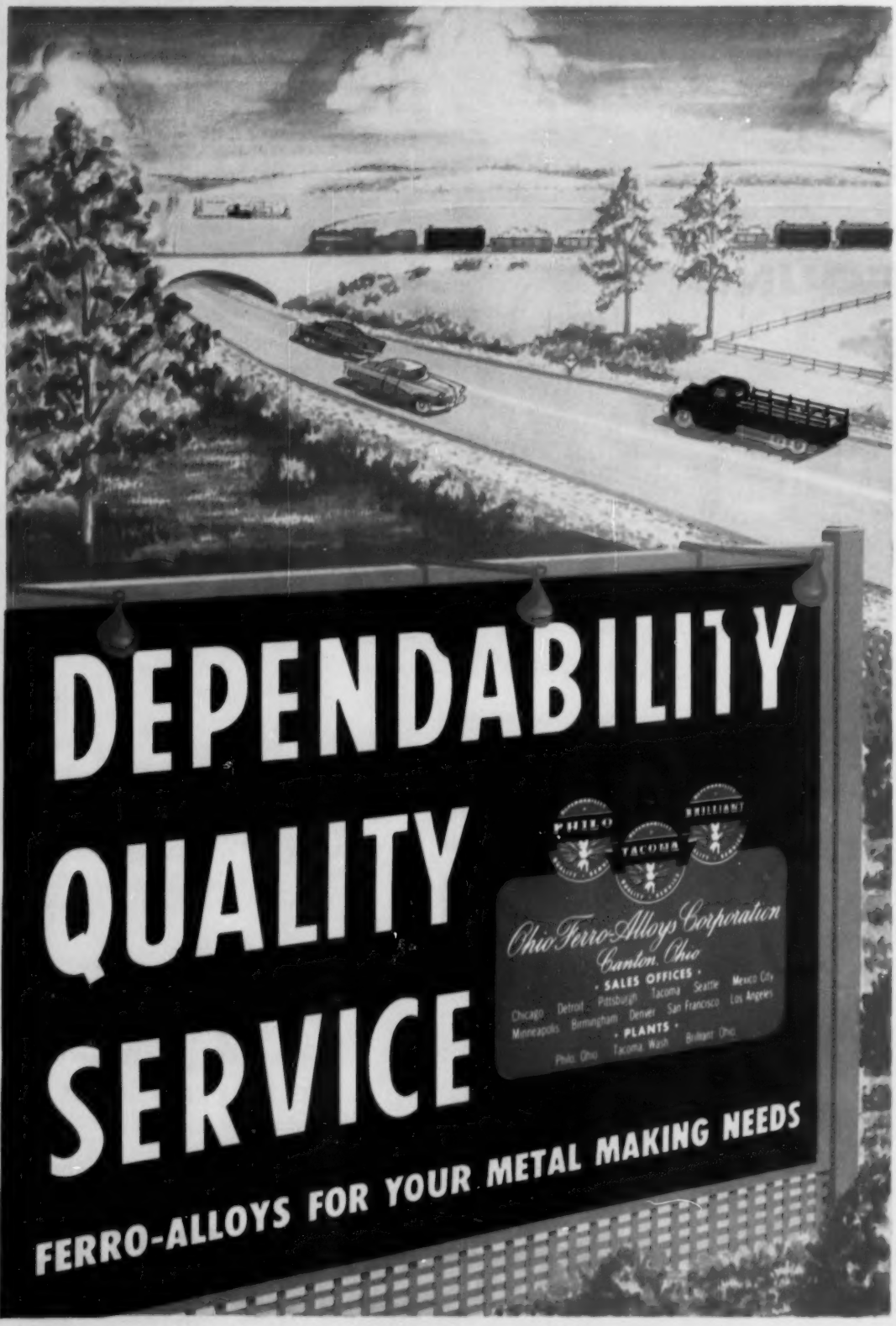

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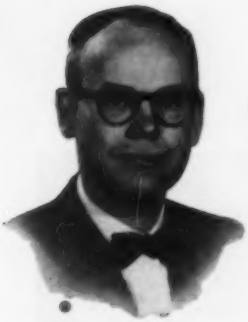


Talk of the Industry

LOOK MA, NO VENTS! Hottest idea in coreblowing today is boxes without vents. You might speculate on such ideas as porous boxes made by powder metallurgy. But that's not the answer. Someday AMERICAN FOUNDRYMAN will tell you all about it.

ADVANCE REGISTRATION for the 1955 AFS Convention—Houston, May 23-27—eliminates waiting in line for a badge . . . you just walk right in. Blanks for advance registration are on pages 53 and 54.

VITREOUS ENAMEL coatings for aluminum castings have been announced by Monarch Aluminum Mfg. Co., Cleveland. Advantages reported are: color appeal, durable surface protection with high resistance to alkalis, acids, and detergents, resistance to thermal shock, to salt water, and to abrasion, and electrical and thermal insulation. Finished castings can be machined without serious damage to the surface. Welding is possible, within the weldable limits of the casting, without undue damage or discoloration to the coating.

MISS IT? Hotel reservation blank for this year's AFS Convention, hotel map of Houston, and condensed program appeared on pages 50-53 of the February issue. If you haven't already done so, send your hotel reservation blank to the Housing Committee in Houston.

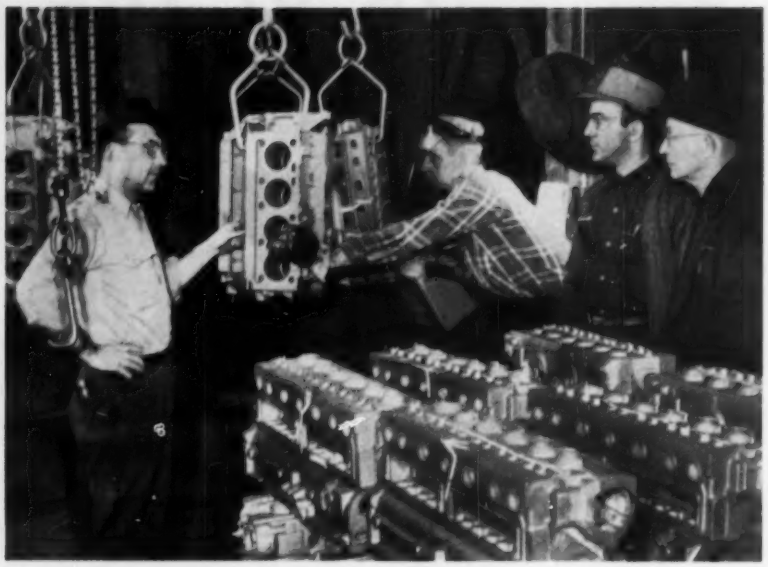
INVESTMENT CAST aluminum alloy spacer blocks for aircraft wing flaps, made by National Precision Casting Corp., Clifton Heights, Pa., have cut costs by approximately 50 per cent. Formerly machined from bar stock, the cast part is so smooth that not even polishing is required.

SOMETHING NEW has been added—a column listing reprints and bibliographies available gratis. Readers can now secure reprints of certain AMERICAN FOUNDRYMAN articles and AFS Convention papers, and bibliographies, on request. Selection is made from a list of those available (see page 22); request can be made on the regular postpaid Reader Service card or by letter.

CONVENTION PAPER PREPRINTS for 1955 can be ordered using the form that will appear in the April issue of AMERICAN FOUNDRYMAN. Watch for it. Forms will not be mailed direct to the castings industry as in the past.

Herbert D. Scobie

Sorting castings from cooling conveyor onto the power-and-free conveyor which serves as surge for the blast machine.



Heads of core, molding, and melting departments view the first of the day's block production with the inspector as it emerges from the shot blast.

General view of snag grinding, finish chipping, and inspection facilities for processing manifolds.

HARRISON A. GRABER / *General Foreman, Foundry Div. Studebaker-Packard Corp., South Bend, Ind.*

Cleaning Room

Production Control . . . Costs . . . Communications

Good cleaning room practice requires that castings be handled a minimum number of times and transported the shortest possible distance, coupled with the fastest process time, to achieve the lowest cost and the required quality. The author outlined his practice at the latest Metals Casting Conference.

■ Production control is a challenge to all cleaning room supervision. Among the many aspects which must be considered are the flow of castings through the department, process and equipment, operations and their sequences, and at all times—high quality standards.

Re-routing six cylinder combination manifolds through the cleaning room is an example of cost-cutting production control that saved 16¢ on processing each casting. Activity diagrams (page 37) show "before and after" routings of manifolds.

Castings formerly were delivered to the cleaning room in basket containers and on fixtures hung from the casting cooling conveyor. Manifolds were dumped

Processing lines for hand finishing operations on V-8 and L heads.

Automatic print-weight scale with 99 to 1 ratio is used to count rough castings as they enter cleaning room.

from the baskets onto a trimming table where they were trimmed and sorted into open-end tote boxes. They were trucked 280 ft to the cleaning mill area. Milling was followed by snag grinding 100 ft away, and rough chipping another 100 ft away, followed by finish chipping 120 ft farther.

Manifolds were then transported 80 ft to the water test station. From there they were trucked 120 ft to a drying area where they were dried under heater type fans. The next operation was table blasting to remove rust from the intake ports, a move of 120 ft. Inspection was another 120 ft from the table blast. Manifold production was then weighed and recorded at a scale 180 ft away and moved another 180 ft into storage. Twenty-two hours of process time included handling the castings 12 times and transporting them 1340 ft at a cost of $27.37 per 100.

Processing was changed and manifolds were re-routed through the cleaning room. From the unchanged cooling conveyor and sorting table, manifolds now are trucked 20 ft to the mills, then 60 ft to the shot blast. Next they are moved 100 ft to the snag grinder, then 20 ft more to rough and finish chipping and grinding for machine location. Manifolds are then transported another 20 ft to inspection, then 40 ft to the scale for weighing and recording, then 60 ft into storage.

Manifolds are now processed in 11¾ hr with nine handlings and 320 ft of transporting, at a cost of $10.98 per 100. Saved are 1020 ft of routing distance, three handlings, and 10¼ hr of process time valued at $16.39 per 100.

Supervision should always watch for the chance to realize savings by eliminating a process. In the case of the manifolds it was possible to eliminate the water test and save $2.29 per 100 because the customer was water testing the manifold for a special purpose and, at no extra cost, was able to perform the cleaning room water test also.

Another phase of controlling casting flow through the cleaning room calls for providing surge areas near certain operations. A stock pile of castings, insures against a break in the flow of castings due to difficulties in another area of the foundry. The surge area allows the rest of the foundry to work when equipment breaks down in the cleaning room. Surge areas thus provide insurance for certain major costs such as 4-hr call-in pay and nearly $1000 to start melting.

Surge ahead of blast operations allows the conveyors through the machine to be fully loaded and thus minimize maintenance by keeping the machine from blasting itself when running with half-filled lines.

Reducing material costs is an ever present challenge to cleaning room supervision. In most cases this means getting the most use of expendable process materials such as grinding wheels and shot.

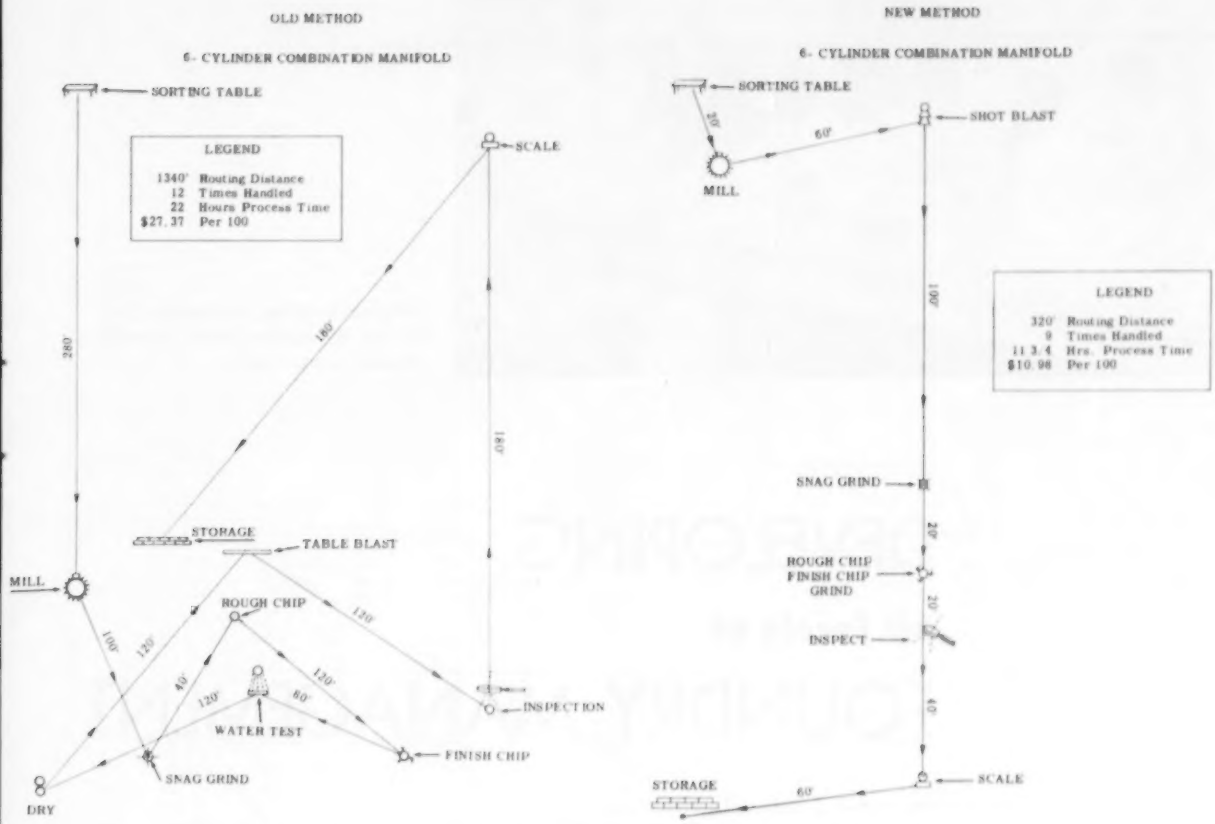
Grinding wheels operate most efficiently and have longest life when their surface speed is kept constant as they wear. This, however, means that the grinder must be speeded up as the wheel gets smaller until it is too small to be useful and must be discarded. Of course, it is most important to have the proper wheel for the job; but casting differences make this a concern for each individual job.

No matter what kind of shot is used or casting is cleaned, the shortest cycle producing the desired finish should be determined and set to keep shot consumption and machine maintenance to a minimum.

Under Studebaker's statistical quality control procedure, a daily casting trouble chart is distributed to the foundry manager and all department heads concerned. If normal efforts are unable to keep quality within limits, the heads initiate investigation that brings about correction of the abnormality. Another advantage of this type of chart is that when there are no or few jobs out of limits, the jobs can be reviewed and the limits may be reduced with a corresponding increase in quality.

A visit to another foundry brought about a recent method change that provides for castings to be counted on a 99-to-1 ratio scale as they enter the cleaning room from the foundry. A ticket is attached to each tub of castings that identifies the casting, lists the number, and has enough tear off stubs so that each operator will have a stub to turn in to his foreman as evidence of his production.

The number of castings weighed into storage plus those scrapped plus those in salvage must total the number entering the cleaning room. The two-scale system



thus provides a check on production and a constant inventory.

The cleaning room of this foundry is the inspection and communication center for the whole foundry. It is common to see the cleaning, molding, core, and cupola bosses at the first inspection station of the cleaning room viewing the first castings made on that day, 3½ hr previous.

It is the understood responsibility of every cleaning room line supervisor to contact the line foreman in the molding and core departments with respect to defects when they occur. The cleaning room boss should, however, be careful not to complain about or give credit for a casting unless he is sure of his ground.

Cleaning room supervision should be included in meetings of plant supervision when over-all foundry problems are discussed. Such problems as new casting design, changes in gating on old jobs, customer complaints, equipment changes, and engineering changes, can be handled best when all phases of foundry work are represented.

Contacts between cleaning supervision and the customer (in this case the plant machine shop) should be close so that, with the report of defects found in machining and a knowledge of machining operations, locating points, clamping points, and stock finish, supervision may keep cleaning operations to a minimum yet afford the greatest amount of service possible. Service includes inspection that passes a minimum of defective castings and salvage that is prompt and effective.

Foundry's "customer" is the Studebaker-Packard machine shop where V-8 blocks are undergoing the first machine operation.

Foreman training conference conducted by author helps develop foundry supervisors.

DEVELOPING *all levels of* FOUNDRY MANAGEMENT

DONALD F. LANE / *Vice-President*
National Foremen's Institute, Inc., New York

Companies which have concentrated on training employees and developing all levels of management appear to be more healthy and solvent than companies which lack formal or informal training plans.

■ Every organization is concerned with what shall be done or manufactured, how well should it be done, and who is best qualified to do it. Getting the job done at any level depends largely upon technical ability and managerial ability.

The first can be acquired through technical schools and colleges, or through deliberately planned learner and apprenticeship training programs. Many companies are making certain that a segment of their employees become technically proficient through on-the-job training programs which involve stipulated periods in the core room, foundry, drawing room, machine shop, etc. Related technical training such as blueprint reading, mathematics, physics, and chemistry or metallurgy is offered in the local evening schools or is provided by members of management. The AFS Apprentice Training Committee is doing much in the way of developing technical ability.

However, technical ability in itself is not sufficient for any supervisor, foreman, or manager to get the job done through others. He must in addition to technical ability possess managerial competence.

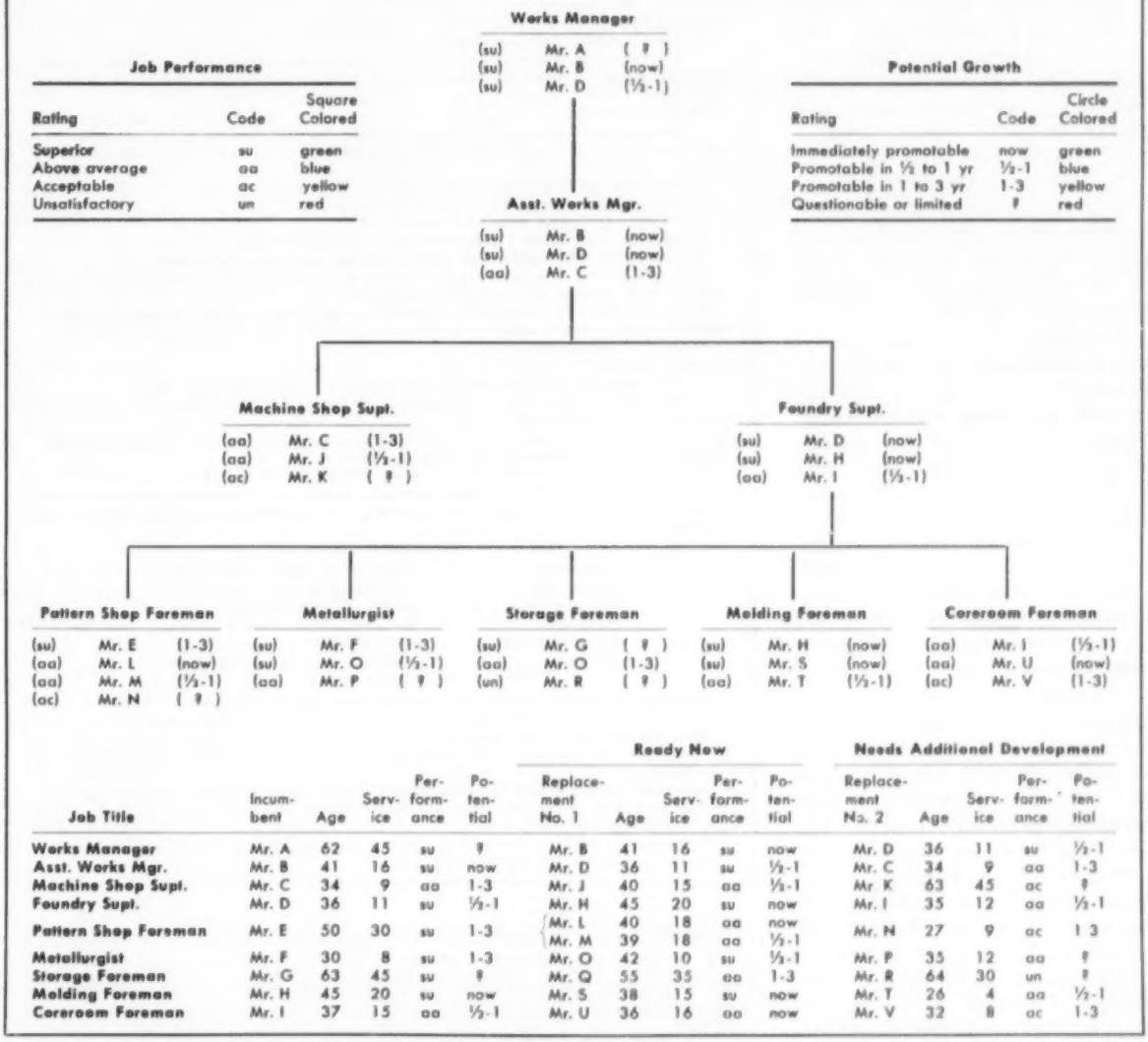
Managerial competence can be acquired through management development sessions both on and off the job, through the universities, and attending such professional sessions as are staged at AFS conventions. Also, through individual study. Individual development is commendable but it often doesn't follow a pattern geared to company needs. It is one thing to make certain that supervisors are technically proficient and another to keep them up to date technically.

To do a commendable job of developing all levels of management, it is necessary first to improve selection procedure, that is, upgrading from the rank-and-file to the first rung of the management ladder. A man should be selected on the basis of past performance, potential development ability, and ability to get along with others or get things done through others. He should be carefully indoctrinated in his new duties by line and staff management. He should learn company policies, rules, regulations, and something of the specific responsibilities of his new management job.

Men recruited from colleges and universities should be given some operating experience before being assigned line duties.

Company management philosophies and objectives should be reduced to writing. Each manage-

Typical Replacement Chart


Works Manager
(su) Mr. A (?)
(su) Mr. B (now)
(su) Mr. D (½-1)
Job Performance
Rating | Code | Square Colored
Superior | su | green
Above average | aa | blue
Acceptable | ac | yellow
Unsatisfactory | un | red
Potential Growth
Rating | Code | Circle Colored
Immediately promotable | now | green
Promotable in ½ to 1 yr | ½-1 | blue
Promotable in 1 to 3 yr | 1-3 | yellow
Questionable or limited | ? | red
Asst. Works Mgr.
(su) Mr. B (now)
(su) Mr. D (now)
(aa) Mr. C (1-3)
Machine Shop Supt.
(aa) Mr. C (1-3)
(aa) Mr. J (½-1)
(ac) Mr. K (?)
Foundry Supt.
(su) Mr. D (now)
(su) Mr. H (now)
(aa) Mr. I (½-1)
Pattern Shop Foreman
(su) Mr. E (1-3)
(aa) Mr. L (now)
(aa) Mr. M (½-1)
(ac) Mr. N (?)
Metallurgist
(su) Mr. F (1-3)
(su) Mr. O (½-1)
(aa) Mr. P (?)
Storage Foreman
(su) Mr. G (?)
(aa) Mr. O (1-3)
(un) Mr. R (?)
Molding Foreman
(su) Mr. H (now)
(su) Mr. S (now)
(aa) Mr. T (½-1)
Corerоom Foreman
(aa) Mr. I (½-1)
(aa) Mr. U (now)
(ac) Mr. V (1-3)

						Ready Now					Needs Additional Development				
Job Title	Incumbent	Age	Service	Performance	Potential	Replacement No. 1	Age	Service	Performance	Potential	Replacement No. 2	Age	Service	Performance	Potential
Works Manager	Mr. A	62	45	su	?	Mr. B	41	16	su	now	Mr. D	36	11	su	½-1
Asst. Works Mgr.	Mr. B	41	16	su	now	Mr. D	36	11	su	½-1	Mr. C	34	9	aa	1-3
Machine Shop Supt.	Mr. C	34	9	aa	1-3	Mr. J	40	15	aa	½-1	Mr K	63	45	ac	?
Foundry Supt.	Mr. D	36	11	su	½-1	Mr. H	45	20	su	now	Mr. I	35	12	aa	½-1
Pattern Shop Foreman	Mr. E	50	30	su	1-3	Mr. L Mr. M	40 39	18 18	aa aa	now ½-1	Mr. N	27	9	ac	1 3
Metallurgist	Mr. F	30	8	su	1-3	Mr. O	42	10	su	½-1	Mr. P	35	12	aa	?
Storage Foreman	Mr. G	63	45	su	?	Mr. Q	55	35	aa	1-3	Mr. R	64	30	un	?
Molding Foreman	Mr. H	45	20	su	now	Mr. S	38	15	su	now	Mr. T	26	4	aa	½-1
Corerоom Foreman	Mr. I	37	15	aa	½-1	Mr. U	36	16	aa	now	Mr. V	32	8	ac	1-3

Job performance and potential shown in code are usually indicated on replacement charts by colored squares and circles.

ment position should be delineated by a position description covering:

- Basic Function
- Reporting Relationships
- Major Objectives and Responsibilities
- Limits of Authority
  - (a) For establishing policy
  - (b) For incurring expense
  - (c) Personnel changes
  - (d) For establishing methods and procedures

Reducing things to writing clarifies thinking and makes objectives clear. Such a position description is a pact between the man and his company. He works better because he knows what is expected of him.

Position descriptions should be made for all levels of management, from president to assistant foreman. These should be keyed in with organization charts and placed in a manual and made available to all levels of management.

Next, the qualifications or performance standards required by each position being inventoried should be listed.

After this step has been completed, prepare experience and education histories on all men to be inventoried. This step usually discloses the latent potential experience which isn't being utilized.

The position standard should be compared with the performance of the position holder. In many companies today periodic appraisals are made of all management positions by the man's immediate superior and associated supervision. The results of the audit are discussed with the individual including his assets and liabilities. A gap sheet is then used to develop an improvement program.

Replacement charts based on or-

ganization charts are established to identify at least two backstops (if possible) for each position. Also each incumbent's position is color coded for future position. For instance, green might mean immediately promotable; blue, promotable in from six months to a year, but needs more training and experience; and yellow, promotable in from one to three years, thus needs considerable training. Red means questionable due to insufficient time on the job, not physically up to it, about ready for retirement, or limited in developmental capacity.

Training needs for each person being inventoried are then established. This is done by the immediate supervisor and associated supervision. It may be desirable to give an individual additional supervisory experience in another job rotation cycle. An outline of suggested readings or an evening or extension course may be indicated. He may require more individual coaching, or might profit from understudying a key supervisor or executive.

A number of people may possess the same liabilities and it may be desirable to offer formalized type of improvement programs such as in conference leadership, public speaking, technical report writing, etc. The company may want to subscribe to professional periodicals or offer formalized programs on such subjects as: Organization, Administration, Development of Understudies, Delegating Responsibility, Planning, Executing, Acquiring Authority, and Communication.

Other suggested subjects are: The Foreman as a Manager, Modern Personnel Practice, Understanding People. The Foreman in the Role of Leader, Eliminating Worker Irritations, Maintaining Good Working Conditions, Safeguarding the Worker, Workers' Home Problems, Maintaining the Working Force, Training Workers on the Job, Getting Along with Other Foremen, Getting Along with the Man Above, Care of Equipment. Also Effective Departmental Layout, Planning the Work, Maintaining Quality Standards, Handling Material, Eliminating Waste, How Costs Are Kept, Wage Incentives, Cost Factors Which the Foreman Can Control, Putting Company Plans and Policies into Action, Foreman's Relationship to Management, Self Management, Induction and Orientation, and Work Simplification.

In recent years the AFS Foremen Training Committee has published a manual entitled Guide for Foremen Training Conferences which can be of assistance to foundry management in developing all levels of supervision.

It is one thing to organize a long range management development program but it is something else to hold good people. Good people can only be retained by being properly compensated for performance. A wage or salary plan should provide the job holder an opportunity for financial growth on his job. That is, he should be able to move up three to five increments before reaching the ceiling of his position. People won't exert themselves to want to improve unless there is something in it for them.

In summary, it can be said that a sound program of management development will assist in determining long range objectives; clarify authority; eliminate overlapping and duplication; establish line, service and staff relationships; denote accountability; provide for management growth; and insure a reservoir of potential incumbents to assume executive responsibility when the time comes. Operations and service improve; operating costs diminish; a hard-hitting supervisory team results which will increase management's influence with subordinates by bringing about better understanding and support of policies and procedures.

Position Description for Foundry Superintendent

Basic Function

Directs the production of patterns and castings to meet engineering specifications and production requirements.

Reporting Relationships

1. Reports to the works manager.
2. The following report directly to him: metallurgist, pattern shop foreman, storage foreman, molding foreman, coreroom foreman, foreman and leading men in the cleaning department.

Major Responsibilities

1. Responsible for the organization, supervision, transfer, revision of job classifications, and coordination of personnel of pattern shop and foundry to meet production requirements.
2. Schedules foundry, pattern shop, coreroom, cleaning room work.
3. Interviews vendors of materials and equipment.
4. Handles grievances within his department.
5. Approves application for employment in his department.
6. Cooperates with engineering, machining, and inspection departments.
7. Communicates with supervisors and other personnel through meetings, conferences, and letters in developing managerial personnel.
8. Coordinates and cooperates with plant engineer, chief engineer, manager of metals fabricating department, director of industrial relations, purchasing agent, and superintendent of machine shop.

Limits of Authority

1. May establish policy within his department by recommending changes.
2. May incur expenses in recommending the requisition of materials and equipment used in the manufacture of castings.
3. May make personnel changes including selection, promotion, termination, and compensation; subject to approval of the works manager.
4. Has full authority to establish methods and procedures within his department.
5. Authorized to take any other action necessary to carry out the responsibilities assigned to him so long as such action conforms with established company policies and practices.

Appraisal Factors

Accuracy of work	Constructive, independent thinking
Cooperation	Acceptance of responsibility
Neatness, orderliness	Initiative and enthusiasm
Personality	Knowledge of scientific principles
Organizing ability	Ability to learn new methods
Judgment	Ability to write and express ideas

How to Appraise

Study the employee. Observe daily employee performance, attendance, attitudes, aptitudes, ambitions, habits, etc.; get all the facts; list strong and weak points.

Plan the talk around an improvement program. Decide exactly how to start and end. Let the employee know where he stands, and be sure to give constructive suggestions for improvement.

Interview. Choose a time and place that will allow privacy. Put the employee at ease. Present your talk objectively. Make him feel that you have his interest at heart. Leave him anxious to improve.

Follow-up by checking the progress of the employee frequently. Offer guidance and correction and be sure to build confidence.

Why does used sand have such low strength when the accepted clay test shows it to have a high clay content?

Clay Test

for carbon-bearing sands

J. S. SCHUMACHER / *Chief Engineer*
Hill & Griffith Co., Cincinnati

■ According to the AFS FOUNDRY SAND HANDBOOK, 1952 edition, Section 5, paragraph 3, page 29: "AFS clay is that earthy portion of foundry sand which, when suspended in water, fails to settle one inch per minute, and which consists of particles less than 20 microns in diameter."

The method for clay removal from a properly prepared sand sample consists, according to the HANDBOOK, of allowing the mass to settle in the water for 10 minutes, siphoning off, refilling, stirring and repeating the process until the water is clear to a depth of 5 inches.

This standard AFS clay test procedure is fairly suitable for new unused sands, not complicated by organic additions. However, when combustibles are present in the sand as they are in used molding sand, the test does not reflect the true clay content.

The method described not only separates "the earthy portion of a sand" referred to as clay, but also all additives that fail to settle in water faster than one inch per minute, such as seacoal, pitch, cellulose, and cereals. Additives which float, therefore, come off as clays. Some of these additives are plastered to the sand grains, and may or may not come loose in the washing process. Therefore, according to the present standard clay determination method, both clay content and sand grain portions of the sample are in error by the amount of organic combustible matter in each.

Several foundry operators use the following procedure to produce more accurate results: Prepare two dry representative samples of the sand to be tested, and mark them A and B.

Sample A is a 2-gr sample of sand weighed from sand carefully dried for 2 hr at 230 F. Deposit the sample in a Coors porcelain crucible, place the crucible in a muffle furnace at 1742 F (950 C), and burn to a constant weight. Calculate loss in weight in per cent; this is the per cent total combustible material in the sand.

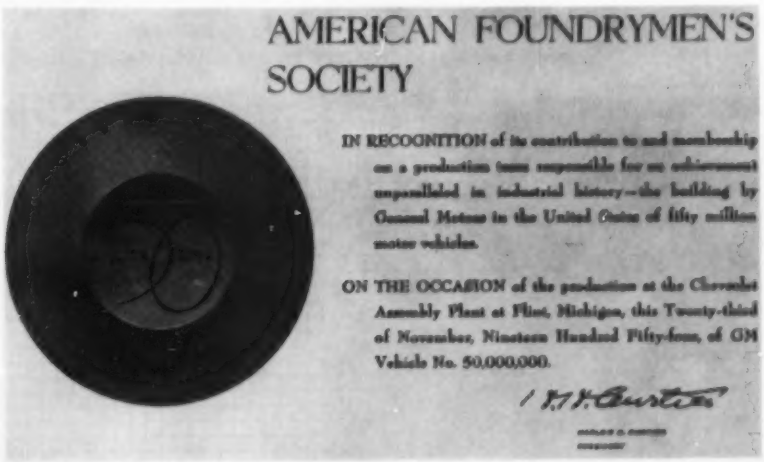
Sample B is used in the standard clay test as shown in the HANDBOOK. Dry the residue sand from this test and run a total combustible burn-off on this residue as was done with Sample A.

By subtracting the total combustible of Sample B from that of Sample A the total combustible washed out with the clay in the standard AFS clay test is determined. Therefore, the total clay per cent as found in Sample B minus the total combustible washed out with the clay equals the actual total percentage of clay in the sand as in the following example:

Total combustible in A	4.50%
Total combustible in B	2.30%
Combustible washed out in the clay test	2.20%
Apparent clay from Sample B	11.40%
Combustible washed out	2.20%
Actual AFS clay in the sand	9.20%

It is recognized that this test does not take into consideration the loss of water of hydration in the clay. However, this would be a minor figure, and consistent with the total clay as calculated above. This method eliminates the variable caused by variations of combustible additions to the sand and should give results closer to the true clay contained in a used sand.

Cite AFS for Automotive Contributions


AMERICAN FOUNDRYMEN'S SOCIETY

IN RECOGNITION of its contribution to and membership on a production team responsible for an achievement unparalleled in industrial history—the building by General Motors in the United States of fifty million motor vehicles.

ON THE OCCASION of the production at the Chevrolet Assembly Plant at Flint, Michigan, this Twenty-third of November, Nineteen Hundred Fifty-four, of GM Vehicle No. 50,000,000.

Certificate presented by General Motors Corp. through its president, Harlow H. Curtice, in recognition of the part the American Foundrymen's Society and its members have played in development of information and production methods for automotive castings. Presentation was made on the occasion of the production of General Motors' fifty millionth vehicle.

Fig. 1 . . Make-up yard of the North Birmingham Pipe Plant of the United States Pipe & Foundry Co. Note top charging cupolas.

How to Maintain BED HEIGHT During a CUPOLA HEAT

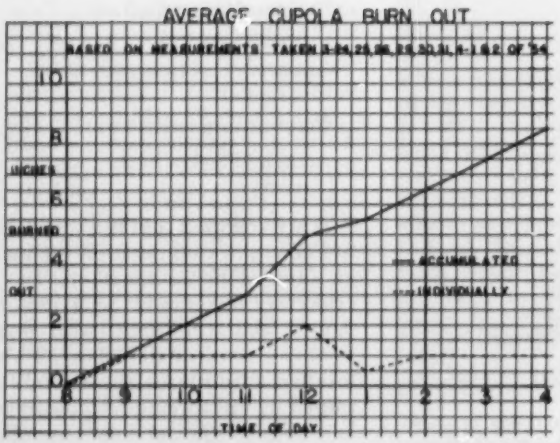


Fig. 2 . . Cupola burn-out was determined by measuring through the tuyeres once an hour during eight heats.

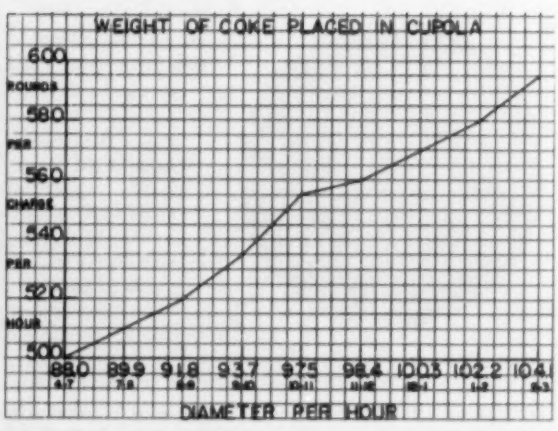


Fig. 3 . . Coke charges are increased each hour to compensate for the calculated amount of cupola burnout.

WESLEY J. ESTES / *Metallurgist*
United States Pipe & Foundry Co., Birmingham, Ala.

Coke bed height is maintained in a 108-in. balanced blast cupola melting 40-plus tons per hour at a ratio of 16 to 1 over 8 to 16 hour heats by using coke charges of increasing weight.

■ The North Birmingham Pipe Plant of the United States Pipe & Castings Co. has three 108-in. balance blast cupolas with 14 main tuyeres and 2 rows of auxiliary tuyeres, 14 in each row. Compared with cupolas in the average foundry, these cupolas are very short, having a burden height of 11 to 12 ft above the coke bed. The cupola stacks have been cut off to allow charging cranes to pass over the top and deposit the charge bucket onto the cupola charging wish-bone.

A 5-ton crane hoist with a 55-in. magnet is used to make up the charge in 60-in. diameter cone-bottom charge buckets. Another crane with a 10-ton hoist is used to charge the cupola.

The cupola blower is of the centrifugal type, rated at 14,100 cfs at 2½ psi, driven by a 200-hp motor, and has a constant air-weight control.

Iron is tapped continuously from the cupola into a 15-ton forehearth ladle. From this ladle, 6000-lb transfer ladles deliver iron to the casting department. The cupola is fitted for front slagging. Slag is fritted and deposited in buckets which are picked up by truck and hauled to a refuse dump.

When operating nine hours per day, the cupolas are lined to 88 in. with fire clay and brick. A honeycomb of 300 to 400 bricks is built around the cupola wall and then rammed with 5000 to 6000 lb of fire clay. A blacking wash is applied to the lining before the bottom doors are closed and the sand bottom placed.

The coke bed is laid to a height of 12 to 14 in. above the top row of auxiliary tuyeres. Gas torches are used to light off the bed at about 9 pm. Filling the cupola begins at about 4 am with normal charges of 6400 lb pig iron, 1400 lb cast scrap, 200 lb steel, 140 lb limestone, and 500 lb coke. A 12-oz blast is put on at 5:45 am and increased as iron is needed.

Normal cupola operation requires a number of booster charges of coke throughout the heat to maintain the bed. This causes irregular and inefficient operation because the melt is chilled as the coke comes down and then gets too hot if the booster charge is large. It was felt that better operation would result if a continuous flow of iron could be had to meet varying demands.

As cupola burn-out takes place the inside diameter increases and the coke bed settles, resulting in a coke bed lower than is required for efficient operation. If the

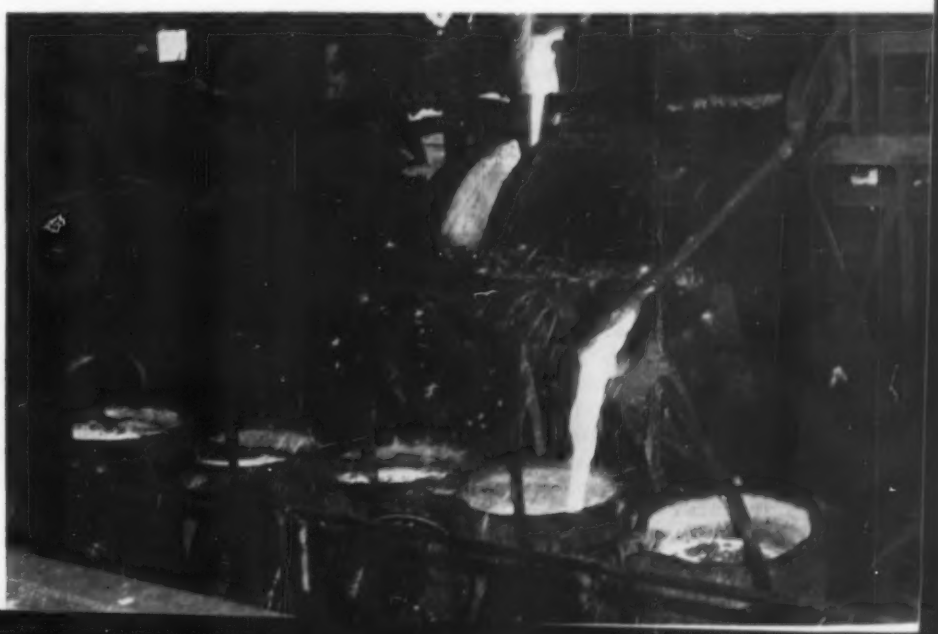


Fig. 4 . . Iron is tapped continuously from front slagging, balanced blast cupola into forehearth.

amount of burn-out at any given time could be determined and compensating increments of coke added, the coke bed could be kept at proper height.

Cupola burn-out was determined in the following manner: The inside diameter of the cupola was measured before and after each heat. On each hour of the melting operation a 1-in. diameter cold roll bar, approximately six feet long was inserted through one of the top auxiliary tuyeres to a distance pre-determined by a mark on the bar. The bar was withdrawn after one minute and measured from the mark to where it was cherry red. This procedure was followed for eight heats with all measurements to the nearest ¼-in.

Measurements through the tuyeres and of the burn-out diameter were, with one exception, within one inch of each other (see table). A 3-in. difference on the 7th heat was probably the result of a build-up over the tuyeres after the last tuyere measurement was taken.

The average burn-out for the eight days was then calculated (Fig. 2). Before it was possible to calculate the amount of coke to be added to each charge to maintain bed height it was necessary to determine the ratio of burn-out at the tuyeres to burn-out between the tuyeres. It was found that the average inside diameter of the cupola between the tuyeres, after burn-out, was 104 in. when the average at the tuyeres was 96½ in. This meant that the lining burned back an average of 16 in. per heat between the tuyeres and only 8½ in. at the tuyeres. Since the hourly measurements were made at the tuyeres it was necessary to factor the measured burn-out by the ratio of 16 to 8½ or 1.9 to 1. Therefore, for each inch of lining burned out at the tuyeres it was assumed that 1.9 in. of lining burned out between the tuyeres. The estimated lining burn-out for each hour was calculated using this factor.

Through trial and error and years of cupola practice, a coke ratio of 16 to 1 had been established—500 lb coke to 8000 lb metal. This was satisfactory when booster charges of from 300 lb to 500 lb of coke were added throughout the heat. Since the cupola inside diameter was 89.9 in. after one hour of operation, the proportion $500/88 = x/89.9$ was used to determine that 511 lb of coke should be used for an 89.9-in. cupola diameter. This procedure was used in computing coke weights for each hour. Figure 3 shows graphically the weights of coke charged throughout the melt. Weights derived for each hour, such as 511 lb, 522 lb, etc., were rounded to the nearest increment of 5 lb because the coke man is expected to be accurate only within 2 to 4 lb.

The next step was to lay the coke bed, as usual, 12 to 14 in. above the top row of auxiliary tuyeres. When charging the burden at 7:00 am an extra 300-lb charge of coke was added to the 8th and 10th charges along with the regular 500-lb coke charges. From then on the coke charges was increased in direct proportion to the predicted burn-out.

Slag became very green about 8 am and stayed green for an hour, indicating too much coke. Then the slag darkened and the metal temperature dropped. If it had been possible to increase the air at 8 am the melt temperature should have picked up. At the time of the experiment two blowers, a 1¼-lb blower and a 1½-lb blower, were used at the same time to get all the air possible into the cupola. Since then the blower mentioned with equipment has been installed.

At about 11:30 am slag began to get green again and metal temperature began to rise. Again, more air would have been desirable. Extra coke was not added until 2:20 pm, at which time 400 lb were added for "come-down" coke, to be dropped with the last of the heat.

On the second heat the bed and extra 300 lb of coke on the 8th and 10th charges were the same as for the first. Increment charging was started at 7:00 am. At about 9 am slag became dark and there was some slag bubbling in the main tuyeres. At this time a 500-lb booster charge of coke was added. No additional coke was added until 2:20 pm when the regular 400-lb "come-down" charge was put on. The average metal temperature was 20 to 25 F lower than the previous day.

On the third heat the bed and fill-up were the same as for previous heats. It was necessary only to use additional coke for the "come-down" charge. An extra coke charge of 300 lb was added at 8:45 am to the fourth heat, which otherwise was the same as before.

On the fifth and sixth heats it was not necessary to use extra coke, except "come-down" coke. In addition to the last coke charge it was necessary to add an extra 300 lb of coke at 1:15 pm to the seventh heat. Only the "come-down" charge was added to the eighth heat.

Trouble was experienced on the ninth heat when a "deadman" formed in the cupola during the morning and it was necessary to add 300 lb of coke at 8:45 am and again at 9:15 am to try, without success, to melt it out; it was still in there when the bottom was dropped. It was impossible to get a satisfactory amount of air into the cupola and as a result melting was slow.

Estimated and Actual Inside Diameter of Cupola at End of Heat

Heat Date	Estimated Diam, in.	Actual Diam, in.
3-24-54	99	99
3-25-54	96	96½
3-26-54	97	98
3-29-54	96½	96
3-30-54	95	95½
3-31-54	97	98
4-1-54	97	94
4-2-54	95½	96

Melting temperatures over the 8-day test were lower but more uniform and, for the most part, melting was more consistent. Even analyses seemed more consistent.

The average tonnage of melt of five heats of regular coke and booster charges previous to the experiment was 45.6 tons per hr compared to an average of 46.8 tons per hr for the nine heats of increment charging.

Since these experiments increment charging has been changed so that now increments are made each hour until the 550 lb coke charge is reached. The bed seems to maintain its height for the rest of the heat with coke charges held at 550 lb. This holds true for heats of 8, 10, and 16 hours. It is felt that this procedure results in a much more consistent melting rate than was achieved in the past for a 16-hr period at an average of 42 to 44 tons per hour.

It is felt that a good start has been made in this approach to cupola operations and that, as time goes by and more data are accumulated and charging procedures become established, melts should be of higher tonnages at more consistent temperatures and with booster charges completely eliminated.

Mobile Shakeout Uncorks Bottleneck

DAVID WHEELER / *Empire Steel Castings, Inc., Reading, Pa.*

■ Mobile shakeout in a non-mechanized steel foundry cut the cost of shaking out snap flask molds over 40 per cent and increased output by eliminating the bottleneck between the pouring and cleaning departments.

It used to take four men 22 minutes to shake out a line of 22 jolted molds or a line of 36 squeezed molds. One man pushed dollies running on angle iron tracks carrying poured molds to the dump-off grate for that line. He would dump the molds, retrieve the dolly and bottom boards, and place them on a return conveyor. Two men tamped the sand through the grate, while the fourth man removed the castings, by means of a hooked rod, from the grate to an adjacent dump bucket container. The cost of this operation was $1.99 per line; the daily cost per line was $65.67. Installing and operating separate shakeout machines at the end of each of six pouring lines was considered prohibitive.

A home made mobile shakeout solved the problem by allowing one motorized shakeout to be used for all pouring lines. A compressed air device was incorporated to lift molds onto the shakeout.

The mobile unit consists of a 4 x 6-ft vibrating shakeout powered by a 5-hp electric motor, mounted on a 48 x 80-in. I-beam frame. Four 10-in. diameter V-grooved wheels running on angle iron track and a 2-hp motor operating a chain hook-up drive provide mobility. Aprons below the track grates funnel sand onto a conveyor belt for return to recovery units.

A scoop which receives the molds on their dollies and lifts and dumps them onto the shakeout is actuated by two 6-in. diameter by 24-in. long air cylinders operating at 90 psi.

Mobile shakeout cut shakeout time per line from 22 min to 6 min; cut costs over 40 per cent. Note the exhaust facilities at each shakeout station.

A quick-reversing, double-throw, lever-operated, air valve controls the up and down motion of the scoop. The valve and electrical switches are mounted at the end of the shakeout housing at a convenient height. An air line along the entire length of the track has quick attach-detach connectors at each pouring line station to which the mobile unit is easily attached.

Although the new method requires five men, it now takes only six minutes to shake out the same number of molds. Two men push dollies onto the scoop; one of them retrieves the bottom boards, while the other removes the dolly to the return conveyor line. Another man operates the controls to move the unit from line to line, start and stop the shakeout motor, and raise and lower the scoop.

The fourth man using a hooked rod pulls hot castings from the shakeout onto the floor. A fifth man, also with a hook, places the castings into a dump bucket container on a lower floor level.

Labor cost per line with the mobile unit is 68¢; the daily cost per line now comes to $37.29—a saving of $28.38.

The machine paid for itself in less than a working year and has been operating for over a year without ten minutes down-time for maintenance. More important, it has uncorked the bottleneck between departments enabling the foundry to realize increased profits through increased production.

D. J. KAUFMAN / *Assistant Professor Department of Industrial Engineering, Washington University, St. Louis*

R. E. JOHNSTON / *Industrial Engineer, East St. Louis Casting Co., East St. Louis, Ill.*

Sampling for Simplified Scrap Control

A trained inspector in a jobbing or semi-production foundry using samples of sufficient size taken at satisfactory intervals can operate a successful scrap control program without using statistical quality control charts.

■ The modern mechanized gray iron foundry emphasizes maximum production at the highest possible quality level. Maintaining this quality level is a continuous problem for the operating foundryman. Many of the concepts and techniques of statistical quality control can help the foundryman with this problem, with subsequent improvement of scrap control.

Much of what is presented here is the result of work done in a jobbing foundry pouring plain gray iron castings ranging from ¼ to 25 lb. This foundry utilizes jolt-squeeze molding machines and is mechanized to the extent that there is a continuous flow of castings from the shakeout to the cleaning room.

Many foundrymen follow the practice of systematically checking casting quality as soon as possible after pouring. Samples are collected at the shakeout, cleaned, and visually inspected to determine the quality of the particular casting job. Quality here means the absence of external defects found by visual inspection of the cleaned casting. The results of this inspection provide a basis for action; i.e., an indication of whether action should be taken, and what changes must be made to improve the quality level. This sampling practice is fundamental, and is the basis for all work in this presentation.

If any manufacturing operation is observed from the viewpoint of statistical quality control, two types of causes will be found which affect quality.[1] One type, known as chance or random causes, consists of those numerous factors which singly or together create small variations in product quality. These chance causes are inherent in the process; they cannot be eliminated except by some major change. Chance causes, though they occasionally may be located, are not economically worth finding and eliminating. In the foundry, for example, slight variations in metal composition, mold hardness, rate of pour, etc., will cause variation in casting dimensions. If these causes operate in a random manner, castings will show chance variation in dimensions within certain definite, predictable limits.[2]

But if some cause should become non-random, a major change in casting quality will result. In the example above, if a reduction in mold hardness should occur due to a severe drop in molding squeeze pressure, castings would show a tendency to swell. The swell defect could be assigned to the drop in squeeze pressure and to the reduction in mold hardness. The mold hardness in this case is a non-random, or assignable, cause; this is the second type of cause to be found in a manufacturing

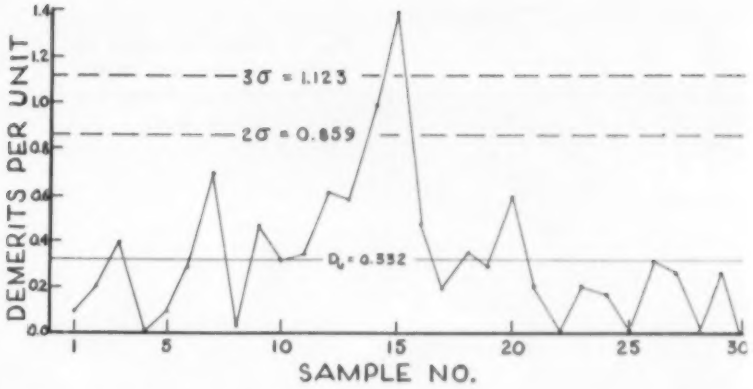


Fig. 1 . . Plot of assigned values for casting defects on a demerit chart indicates the presence of assignable causes when control limits are exceeded.

process. An assignable cause is always economically worth looking for and correcting.

Cause systems which operate in a foundry are of three classifications: always chance, always assignable, and either chance or assignable. The first classification, always chance, includes those causes which may be expected to operate consistently in a random manner. They are plentiful, but are not significant. The day of the week, temperature of the air, and minor sand impurities are a few examples. Each has some effect on casting quality, but the total effect is small and the cause not worth locating.

Causes which are always assignable are seen occasionally in the foundry. Examples are the use of the wrong pattern or core, incorrect pouring weights, and faulty pattern or flask equipment. A gross error in gating or risering would be always assignable. The presence of this type of cause may be quickly determined; the defects which result occur in a repetitive and usually severe manner.

The majority of foundry operating causes belong to the third classification: either chance or assignable. The AFS book ANALYSIS OF CASTING DEFECTS contains a chart of the principal gray iron casting defects and their possible causes.[3] The chart lists 31 principal classes of defects attributable to ten specific and one general operating factor or cause. Except for the few always assignable causes such as those mentioned previously, these eleven causes may operate in either a chance or assignable manner.

If assignable causes are to be found and chance causes ignored, how may the two be distinguished? First consider the ability of a powerful quality control tool known as the Control Chart for Attributes to separate chance from assignable causes. When only chance causes are acting upon the casting process, the quality value of a sample of castings from the process falls within the chart control limits. A sample out of control limits indicates the presence of an assignable cause, and is sufficient evidence for beginning an investigation.

The attribute chart, of which there are several variations, is a useful control device in many cases. However, its use for detecting assignable causes acting upon the casting process in a jobbing foundry is not recommended by the authors for three reasons:

1. The attribute chart is a relatively insensitive tool with frequent samples of 25 or more castings from each job often required to satisfactorily detect quality variations.[4] The number of castings which must be inspected is prohibitive if more than a few patterns are being run.

2. Maintaining a set of control charts—one chart for each pattern—requires considerable clerical expense; in addition, many foundries change patterns frequently.

3. Most significant is the fact that a control chart, though effective if used properly, is not necessary to detect most assignable causes in the gray iron jobbing foundry.

David A. Hill makes use of a "demerit" control chart.[5] His example of this chart is shown in Fig. 1. This type of control chart is useful for products such as castings which have types and degrees of defects. A demerit chart detects the presence of assignable causes by the use of control limits. The chart in Fig. 1 was developed by grouping defects found in inspection into several classes graded from most serious to least serious in terms of consumer reaction. Hill uses four classes: (1) very serious or critical defects, (2) serious or major "A" defects, (3) moderately serious or major "B" defects, and (4) not serious or minor defects. Demerit (point) values are arbitrarily assigned to defects in each class as follows: Class 1, 50 demerits; Class 2, 20 demerits; Class 3, 5 demerits; and Class 4, 1 demerit.

Each point on Fig. 1 is the average of the demerits of 100 product units. (The product in this case is a complex assembly.) Note that samples 14 and 15 fall outside the two standard deviation control limits, indicating the presence of an assignable cause.

A similar chart may be constructed for any casting job. For this one might use the defect classification given in ANALYSIS OF CASTING DEFECTS in the preface: "1—major defects which make the casting a total loss; 2—defects which cost so much to repair that it is questionable whether to salvage or scrap the casting; 3—minor defects which allow economical salvage of the casting."

A fourth class might be added: minor irregularities such as slight surface blemishes, very small sand inclusions, minor dimensional variations, and the like. The foundryman does not recognize these small imperfections and variations as defects; they may be numerous and yet so minor that the casting is considered perfect or nearly so by visual inspection. Using these four classifications, demerits might be assigned for foundry use as follows: Class 1, 50 demerits; Class 2, 40 demerits; Class 3, 35 demerits; Class 4 1 demerit.

Classes 1, 2, and 3 are given high demerit values because each is serious in terms of consumer reaction. It is interesting to note that ANALYSIS OF CASTING DEFECTS

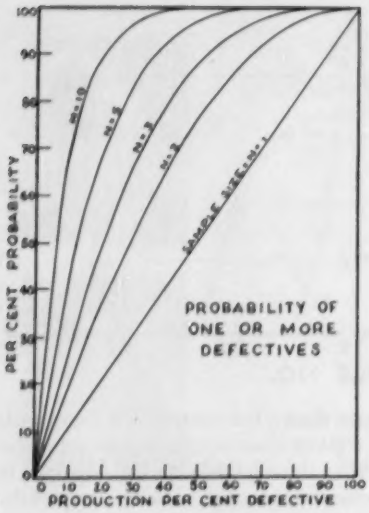


Fig. 2 (left) . . Chance of finding at least one defective casting is shown for several sample sizes.

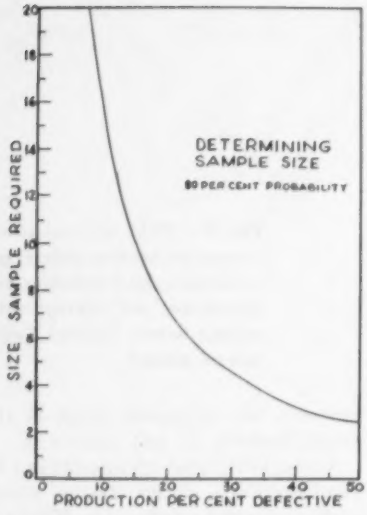


Fig. 3 (right) . . Minimum sample size to find at least one defective casting with 80 per cent probability.

is concerned entirely with these three classes of defects and the causes which produce them. A demerit chart for castings, similar to Fig. 1, would reveal samples with average demerit values falling within the control limits (indicating chance causes at work) having almost entirely Class 4 defects and samples outside the control limits (indicating assignable causes) containing at least one Class 1, 2, or 3 defect. Discovery of a Class 1, 2, or 3 defect usually indicates the presence of an assignable cause for which an investigation should be initiated.

Rather than ask "How can I be sure that this cause is assignable?" the foundryman should ask "How may I be sure that I will find a defective casting so that I may take action?" To answer the last question requires a review of sampling procedure.

Six considerations must be made when constructing a sampling procedure: number of jobs to be sampled, sampling frequency, method of inspection, sample size, evaluation of results, and reporting of findings.

1. Number of jobs to be sampled determines to a great extent the size and type of sampling and the inspecting facilities which will be required.

2. Sampling frequency—how often a sample is taken—should be determined by the nature of the process. If rapid quality changes are common, samples should be taken often. A foundry, for example, may experience sudden quality changes due to a change in the method of metal pouring. Production rate is also a consideration. A gray iron foundry pouring small castings at a high production rate might reasonably try to sample each job at least once each hour.

3. Method of inspection, of taking a random sample, is important and must not be taken for granted. The temptation to select just the "bad ones" at the shakeout is great. Biased sampling such as this may result in finding one type of defect and overlooking another. Care should be taken to avoid sampling from one location; the result may be a sample composed of several castings from the same mold, if multiple pattern matchplates are used.

Some defects, such as runout, are visible as the castings come from the shakeout; but the majority of castings need to be cleaned for visual inspection. A small automatic shotblast machine which the inspector need only load with castings, allowing him to spend his time inspecting castings, has been found to be highly satisfactory.

4. Sample size. The laws of probability are applicable to poker games, public opinion polls, and the sampling of castings. The problem is this: to correct an assignable cause, obviously one or more defective castings must be found. Figure 2 indicates the risks taken when samples are selected by showing the probability (per cent chance of success) of finding one or more defective castings in a sample taken from a lot or production line running a certain per cent defective. Curves are drawn for sample sizes of 1, 2, 3, 5, and 10 castings. To illustrate: if a casting job is being made so that 30 per cent are defective, the chance of finding one or more defective castings in a sample of five is about 84 per cent; that is, success in finding one or more will occur about eight times out of ten. Note the low probabilities (greater risks) incurred by using very small samples for production runs of 10 or 15 per cent defective.

Figure 3 shows the sample size required to insure finding at least one defective casting for a range of per cent defective in production. For example: a foundry is trying to improve the quality of a casting which normally has a daily scrap of 14 per cent. For an 80 per cent probability of finding at least one defective casting, the inspector must take a sample of at least 11 castings. Conversely, if a sample of 11 castings reveals one or more defectives, the chance is 80 per cent that the production is 14 per cent defective or worse. The 80 per cent is chosen arbitrarily; the 20 per cent risk which this involves is reasonably small for this application.

5. Evaluation of results. A quality control inspector performing the functions described here must be thoroughly familiar with casting defects and their causes, and be familiar with the peculiarities of his own foundry so that he will know which assignable causes are most likely to appear.

An experienced inspector usually can detect the presence of an assignable cause on the basis of two or three samples of sufficient size. A simple, effective procedure is to notify the foreman concerned if one or more defects are found in the first sample and a particular cause

is suspected; take a second sample immediately for further evidence.

6. Findings should be reported as soon as sampling indicates the presence of an assignable cause. The inspector does not make the changes necessary to eliminate or modify the cause; but he must notify the foreman concerned or the superintendent to correct the situation. Frequently an effective procedure is to show the defective casting to the molder, pourer, sand muller operator, etc., if the defect is definitely attributable to one man.

Summary. Briefly, the foundryman should keep these considerations in mind when constructing or improving his scrap control program:

1. Most of the principal operating causes in the foundry may operate in a chance or assignable manner.

2. When operating in a chance manner, these causes produce small casting variations and imperfections which the foundryman may usually ignore.

3. When operating in an assignable manner, the result is the appearance of severe quality variations known in the foundry as casting defects.

4. Since defects generally indicate the presence of an assignable cause, action should be initiated when such defects are discovered.

5. The detection of assignable causes in the foundry does not ordinarily require the use of quality control charts.

Bibliography

1. STATISTICAL QUALITY CONTROL FOR FOUNDRIES, (1953 edition). Published by American Foundrymen's Society, Des Plaines, Ill.

2. I. W. BURR, *Engineering Statistics and Quality Control*, (1953), pp. 91-93. Published by McGraw-Hill Book Co., Inc., New York, N. Y.

3. ANALYSIS OF CASTING DEFECTS, (1947 edition), p. xii. Published by American Foundrymen's Society, Des Plaines, Ill.

4. A. J. Duncan, *Quality Control and Industrial Statistics*, (1952), pp. 266-268, 278-280. Published by Richard D. Irwin, Inc., Chicago, Ill.

5. D. A. Hill, "Control of Complicated Products," *Industrial Quality Control*, vol. 8, no. 4, Jan. 1952, pp. 18-22.

6. Figures 2 and 3 prepared from data from:
Tables of the Binomial Probability Distribution, Applied Mathematics Series No. 6 (1949), U. S. National Bureau of Standards, U. S. Govt. Printing Office, Washington, D. C.

Sound Out Grinding Wheels for Flaws

Grinding wheel soundness can be tested by the following ring test described by George B. Michle, Electro Refractories & Abrasive Corp. Suspend the vitreous or porcelain bonded wheel from its center. Tap it with a wooden hammer about 45 degrees either side of the vertical center line and one or two inches from the periphery. A bell-like ring signifies the wheel is sound. A cracked wheel gives off a dull, dead sound. A wheel mounted or resting on its face cannot be tested in this manner.

Electronic sonic comparator used by Electro Refractories tests grinding wheels by accurately measuring sound characteristics of a wheel set in vibration. Sound frequency variations for a given wheel indicate the presence of flaws. Grinding wheels of different grades have characteristic frequencies. Instrument panel includes an amplitude meter, oscilloscope, and frequency dial. Vibrating stylus at the center rear of table is in contact with the wheel. Generated sound is picked up by the microphone at the left. Frequency is measured by the electronic circuit. Portable microphone at the right is used to test wheels too large to be accommodated on the machine table.

ROY KORPI / *Quality Control Laboratories*
Engine & Foundry Div., Ford Motor Co., Dearborn, Mich.

GENE PASSMAN / *Foundry Facing Sales Mgr.*
Frederic B. Stevens Inc., Detroit

Causes of core veining and a veining tendency test have been summarized from a progress report of the AFS Sand Division Committee 8-J (Physical Properties of Iron Molding Materials at Elevated Temperature Committee).

Core Veining

■ Veining denotes the presence of fins, generally in passages and interior corners and surfaces of castings. Veining is due to a rupture of the core surface into which molten metal flows. These ruptures are caused by excessive core expansion which cannot be accommodated by the binders present in the molding materials. Causes of veining are:

Mold Ramming or Hardness. As green hardness increases, the extent of veining also increases. Eliminating veining by reducing mold hardness invites penetration problems.

Metal Temperature. Veining increases with higher pouring temperatures.

Baking Time. Optimum and overbaked cores have a greater tendency to vein than do green and underbaked cores.

Moisture. An increase in moisture content of the core sand mixture tends to increase its veining tendency.

Grain Size. Cores of washed and dried silica sands from 129.5 to 36.1 A.F.S. Fineness Number exhibited the same veining characteristics. A 100 per cent lake sand produced a trace of veining: additions of over 25 per cent bank sand eliminated veining.

Sand Purity. Traces of clay substances and fluxes in the sand proved beneficial in retarding veining.

Additives. The addition of 2 per cent iron oxide to silica sand mixes retarded veining. Separate mixes containing 9.8 per cent silica flour, or 0.75 per cent bentonite, or 2 per cent wood flour exhibited veining. With ⅔ lake sand and ⅓ bank sand base, 1 per cent cereal binder and 2 per cent oil the following was noted: 2 per cent iron oxide eliminated veining; 1 per cent perlite produced slight veining; 2 per cent wood flour reduced veining to a trace; 2 per cent of a formulated binder with high and low temperature ingredients eliminated veining.

Oil Content. When mixes of ⅔ lake sand, ⅓ bank sand, with moisture held constant at 2 per cent, were bonded with 0.5, 1.0, and 1.5 per cent linseed oil, no veining occurred; with 2 per cent oil, veining was encountered.

Cereal Binder. None of three mixes of two parts lake sand and one part bank sand, when mixed with 2 per cent of heavy weight corn flour, light weight corn flour, or dextrin, showed veining tendencies. With core oil held constant at 0.75 per cent and moisture adjusted for proper workability, no veining was encountered when the cereal binder was 0.5, 1.0, 1.5, or 2 per cent.

Bentonite. When up to 1 per cent bentonite was substituted for cereal and corrections were made in the oil to allow for the absorptive effect of bentonite, a trace of veining was noted for both southern and western types.

Type of Core Oil. No changes in veining tendencies were noted in using AFS Reference Linseed Oil, an amber colored core oil with a saponification number of 156, a dark colored polymer core oil with 84 saponification number, or a fast baking core oil.

All reported results of veining were produced on 4 x 4 x 4-in. test castings. The pattern had four core prints in the drag for 1-in. square test cores. These projected 1 in. into the metal. Degree of veining was readily ascertained by observing the hollow portions of the castings which were identified by the batch number of the core producing it.

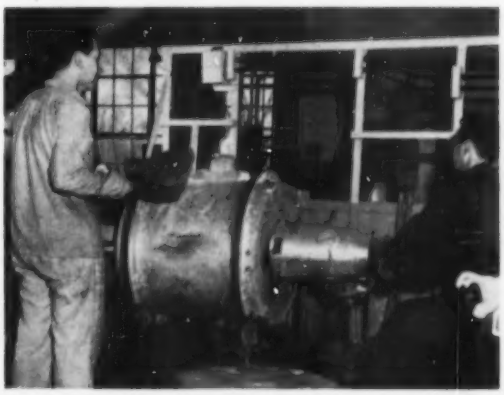
The following tests were performed in an effort to determine the best test method to be used to predict veining tendencies of molding materials: dry hardness, baked permeability, tensile strength, transverse strength, transverse deflection, core gas, gas pressure, core collapsability, confined hollow expansion, and expansion under 5 lb load.

In early test work, the best correlation with veining tendency was the expansion under 5 lb load, as follows: The dilatometer is rigged as for a hot strength test. A 5 psi load is applied constantly to the specimen. As the specimen expands, the movement of the lower table is read from the deformation dial indicator. This movement is divided by two to express growth of specimen per inch and may be termed "unaccommodated expansion."

Later tests, however, discounted this close correlation and new hollow, square specimens were tried with some success. The latest work indicates a 1 x 1-in. square specimen 2-in. long with a ½-in. hole through the center is the most sensitive type. Excellent correlation of veining was found with the square specimen in the following tests: rate of hot deformation, hot strength, modulus of rupture, and hot toughness.

Members of Committee 8-J feel that much progress has been made in the veining project, but some final data must be obtained before a positive method for detection of veining can be recommended for general use in the foundry industry.

Workingest AFS Committee?



Shirt-sleeve-and-coverall-committee 8-J, investigating the physical properties of iron foundry molding materials at elevated temperatures . . .

. . . follows up planned research with work sessions at foundry laboratories to put their theses to test. They do their own sand preparation . . .

. . . molding, melting, pouring, and testing. Results of 8-J work are being published in a series of articles in AMERICAN FOUNDRYMAN . . .

. . . These photographs of a recent work meeting were made by Committee Chairman Robert L. Doelman, Miller & Co., Chicago.

Registration crowds like this pose no problem to convention-goers who register in advance.

Open Advance Registration

for AFS Convention

ADVANCE registration arrangements, awards, and air tours of Mexico—all part of the 1955 AFS Convention to be held in Houston, May 23-27—have been announced.

To register in advance, AMERICAN FOUNDRYMAN readers merely used the convenient cards on the facing page to secure their official badges well in advance of the 5-day series of meetings and avoid the delay of registering in Houston.

Foundrymen are urged to send their advance registration, along with the registration fee (AFS members, $2.00; non-members, $5.00) promptly to facilitate early processing. Personal badge, needed for admission to all Convention sessions except Shop Course meetings, will be forwarded promptly. Advance registration offer applies only to registrations received at AFS Headquarters prior to May 12.

Simultaneous with the opening of advance registration, awards to be presented at the Annual Banquet, the evening of Wednesday May 25, have been announced. Recipients and awards recommended by the AFS Board of Awards and approved by the Board of Directors are:

JOHN B. CAINE, consultant, Wyoming, Ohio—the John H. Whiting Gold Medal—*for outstanding contributions to the Society and the industry, particularly in the field of foundry sand research and applications.*

J. E. REHDER, director of technology and research, Canada Iron Foundries, Ltd., Montreal, Que.—the Peter L. Simpson Gold Medal—*for outstanding contributions to the Society and to foundry knowledge of cast metals.*

ROBERT F. THOMSON, head of metallurgy department, Research Laboratories Div., General Motors Corp., Detroit—the John A. Penton

Gold Medal—*for outstanding contributions to the Society and the industry in foundry research, particularly in the field of light metals.*

A. F. PFEIFFER, Pattern & Foundry Div., Allis-Chalmers Mfg. Co., Milwaukee—Honorary Life Membership—*for contributions to the Society, its chapters, and the industry over many years for better understanding of patterns and their importance in foundry work.*

FRANK C. RIECKS, technical assistant to manager of foundries, Ford Motor Co., Dearborn, Mich.—Honorary Life Membership—*for outstanding contributions to the Society in the design and construction of the new AFS Headquarters Building.*

FRANK J. DOST, president, Sterling Foundry Co., Wellington, Ohio—Honorary Life Membership—*on completion of his term as president of the Society.*

Detail Air Tour

Details of the post-Convention air tours of Mexico, highlighted by visits to historic, cultural, and entertainment centers are given on page 55. Foundrymen and their ladies, who are planning to round out a week of technical meetings with a visit to Mexico, are urged to act promptly in contacting the Harvey Travel Bureau soon so that tour plans can be finalized as early as possible. A number of foundrymen have already indicated their interest as a result of early announcements in the January and February issues of AMERICAN FOUNDRYMAN.

This year's AFS Convention—first in the South since the organization was founded in 1896—will combine five days of technical meetings with plant visits, Convention social events, a program for the ladies, and such traditional events as the Annual Business Meeting, the Charles Edgar Hoyt Memorial Lecture, and the Annual Banquet. Also scheduled is an evening of Lone Star hospitality and entertainment designated as Texas Chapter Night.

Plant visits are being set up to illustrate market possibilities for castings and will include castings users as well as castings producers.

Scheduled for the ladies are a trip on the Houston ship channel, a theater matinee, and a luncheon and style show. Ladies' activities will lead off with the AFS Tea the after-

AMERICAN FOUNDRYMEN'S SOCIETY
HOUSTON CONVENTION MAY 23-27, 1955
ADVANCE REGISTRATION CARD

● TYPE OR PRINT CLEARLY

PLEASE FILL OUT COMPLETELY

NAME_____

POSITION_____

COMPANY_____

*CO. STREET ADDRESS_____

*CITY_____ ZONE____ STATE_____

***NOTE: Show Address and City WHERE YOUR OWN PLANT or OFFICE is located.**

HOTEL TO WHICH ASSIGNED_____

TURN OVER

IMPORTANT

Type or print in reverse side completely. To receive Official Badge in advance of Convention, return card NOW with Registration Fee.

MAIL Direct To: **AMERICAN FOUNDRYMEN'S SOCIETY**
Golf & Wolf Roads
Des Plaines, Illinois

REGISTRATION FEES: Indicate

☐ A.F.S. Members, $2.00

☐ Non-Members, $5.00

YOUR PERSONAL CONVENTION REGISTRATION BADGE WILL BE SENT PROMPTLY TO YOUR ATTENTION.

Register In Advance

Wear Your Badge . . . Walk Right In

Foundrymen . . . AFS Members . . . non-members . . . guests . . . secure your official badges in advance of the 1955 AFS Convention, Houston, May 23-27. Avoid filling out cards or waiting in line for badge to be typed. Be free to greet your friends, and to attend the meeting of your choice without inconvenience or delay.

It's simple. Fill out completely one of the cards above. Mail it to American Foundrymen's Society, Golf & Wolf Roads, Des Plaines, Ill., together with member registration fee of $2.00 or non-member fee of $5.00. Convention badge for your personal use (needed for admission to all sessions except Shop Courses) will be sent promptly.

Pass on the other Advance Registration Card to a friend who may be planning to attend this year's AFS Convention.

continued on following page

IMPORTANT

Type or print in reverse side completely. To receive Official Badge in advance of Convention, return card NOW with Registration Fee.

MAIL Direct To: AMERICAN FOUNDRYMEN'S SOCIETY
Golf & Wolf Roads
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REGISTRATION FEES: Indicate ☐ A.F.S. Members, $2.00 ☐ Non-Members, $5.00

YOUR PERSONAL CONVENTION REGISTRATION BADGE WILL BE SENT PROMPTLY TO YOUR ATTENTION.

AMERICAN FOUNDRYMEN'S SOCIETY
HOUSTON CONVENTION MAY 23-27, 1955
ADVANCE REGISTRATION CARD

● TYPE OR PRINT CLEARLY

PLEASE FILL OUT COMPLETELY

NAME_____

POSITION_____

COMPANY_____

*CO. STREET ADDRESS_____

*CITY_____ ZONE____ STATE_____

*NOTE: Show Address and City WHERE YOUR OWN PLANT or OFFICE is located.

HOTEL TO WHICH ASSIGNED_____

TURN OVER

Register today. Advance registration offer applies only to registrations received prior to May 12.

Hotel to which you are assigned (hotel application blank appeared in the February issue of *American Foundryman*) should be listed if you have this information at the time you apply for advance registration. Hotel name enables friends to locate you at the Convention. If your hotel has not been assigned, send in your advance registration anyway. Your hotel can be added to your card at the Convention by merely requesting one of the clerks at the AFS Registration Desk on the mezzanine floor of the Rice Hotel to do so.

If you prefer to register at the Convention, fill out one of the Advance Registration Cards and bring it with you to Houston. Won't save as much time but it's faster than starting from scratch after you arrive.

Register In Advance

Wear Your Badge . . . Walk Right In

noon of Monday, May 23 and will, of course, include the Annual Business Meeting and Annual Banquet (both Wednesday, May 25) and Texas Chapter Night (Thursday, May 26).

Texas Chapter Night will feature a mounted drill by the 21-man Sheriff's Posse with fast precision riding and a torchlight number. All members of the Posse are business and professional men who maintain topflight quarter horses and represent the best riders in an organization of about 100. A barbeque dinner will be served from a chuck wagon, following which the sheriff has some "arrests" to make.

Present Cash Awards

The Annual Business Meeting, with AFS President Frank J. Dost, Sterling Foundry Co., Wellington, Ohio, presiding, will be highlighted by the presidential address, election of officers (for nominations see page 65, February issue), and presentation of cash awards and certificates to top winners in the AFS Apprentice Contest.

Deadline for the 1955 AFS Apprentice Contest is April 1. On this date all patterns and castings to be considered in the national judging must be in the hands of Prof. Ray W. Schroeder, General Engineering Dept., University of Illinois, Pier 47, Navy Pier, Chicago, Ill.

Following the business meeting, Fred J. Walls, International Nickel Co., Detroit, will present the Charles Edgar Hoyt Memorial Lecture.

Other technical highlights of this year's AFS Convention include three symposia, a motion picture illustrating the carbon dioxide-sodium silicate methods of hardening molds and cores, and the latest AFS research film on studies of vertical gating systems.

The three symposia are: H. A. Schwartz Memorial Symposium featuring papers on heat transfer, an AFS activity headed by the late Dr. Schwartz for many years—the afternoons of Wednesday and Thursday, May 25 and 26; Symposium on Non-Destructive Testing, sponsored in cooperation with the Society for Non-Destructive Testing—the afternoon of Friday, May 27; and Symposium on Quality Improvement of Molten Iron—Thursday morning, May 26.

In all, some 70 technical papers covering every phase of foundry

practice will be presented at 45 sessions during the 5-day convention. In addition to these sessions, at which prepared papers will be presented, 17 informal sessions are on the program. These are the Round Table Luncheon and Shop Courses which feature informal discussion of shop problems that face many of those who attend the meetings.

The eight Round Table Luncheons scheduled, in addition to a Sand Division Dinner (Tuesday, May 24), are: Malleable (Monday, May 23); Brass & Bronze (Monday, May 23); Education (Tuesday, May 24); Light Metals (Tuesday, May 24); Pattern (Wednesday, May 25); Gray Iron (Wednesday, May 25); Industrial Engineering (Wednesday, May 25); and Steel (Thursday, May 26).

Shop Course meetings will be held on Monday, May 23 and Tuesday, May 24 at 4:00 pm and 8:00 pm. These sessions—the only ones not requiring a Convention badge for admittance—will cover brass and bronze subjects and malleable practice in simultaneous afternoon sessions each of the two days. Two sessions scheduled for each evening of May 23 and 24 will cover gray iron and sand subjects.

Avoided Simultaneous Scheduling

All Convention meetings have been scheduled to enable foundrymen to attend the maximum number of meetings in the minimum time. Insofar as possible, simultaneous scheduling of meetings likely to interest the same group of convention-goers has intentionally been avoided.

Brass and bronze, and light metals sessions are scheduled for the early part of the week; gray iron and steel are scheduled for the middle and latter part. Sand sessions will run throughout the week. Others, such as safety, hygiene, and air pollution control, education, industrial engineering, refractories, and heat transfer are planned for the middle of the week.

Preprints of Convention papers available April 1 will be listed in the April issue of AMERICAN FOUNDRYMAN along with a form for requesting those in which readers are interested. The April issue also will contain abstracts of papers scheduled for presentation.

Tour Mexico

After AFS Convention

Three air tours of Mexico have been scheduled especially for foundrymen and their ladies attending the AFS Convention in Houston, May 23-27, according to F. M. Wittlinger, Texas Electric Steel Casting Co., Houston, general convention chairman. Costing approximately $245, the nine-day tours will start at the close of the Convention.

Early arrangements for reservations should be made with E. R. Brown, Harvey Travel Bureau, 2005 West Gray Ave., Houston 19, Texas.

Group 1 leaves Houston Sunday, May 29, at 3:30 pm via 66-passenger plane, arriving non-stop in Mexico City at 6:45 pm.

Group 2 leaves Houston Monday, May 30, at 8:00 am, arriving in Mexico City at 1:15 pm; there are brief stops in Brownsville, Texas, and Tampico, Mexico.

Group 3 leaves Houston Monday, May 30, at 3:30 pm, arriving non-stop in Mexico City at 6:45 pm.

Each group will be met on arrival in Mexico City and will be transferred to the Del Prado Hotel. On May 30, **Group 1** will take a Mexico City sightseeing tour combined with a visit to University City and surrounding residential area. Luncheon is included.

Groups 1, 2, and 3 will take a sightseeing trip to Guadeloupe Shrine, Acolman, and the Aztec Pyramids on Tuesday, May 31 (includes luncheon). Wednesday, June 1, the three groups will motor to Cuernavaca for lunch and sightseeing at that famous resort city, and in the afternoon will proceed to the Spanish Colonial "Silver City" of Taxco for an overnight stay in deluxe hotels.

All groups leave Taxco Thursday, June 2, by way of Hacienda Vista Hermosa where lunch will be served in a famous early-day hacienda with one of the most beautiful swimming pools in Mexico. Returning to Mexico City, the groups fly to Acapulco for a two-night stay (June 2 and 3) in deluxe hotels. During the stay, a jungle trip across the bay will be offered and an optional fishing trip (includes sailfish and marlin) for a limited number will be offered at $8-10 per person depending on the number aboard each fishing boat.

All meals are included while away from Mexico City—in Cuernavaca, Taxco, Vista Hermosa, and Acapulco.

Saturday, June 4, all groups return to Mexico City. That night a tour of typical night clubs is offered, with drinks in each club, and a floor show and dinner at one of the better ones. Sunday, June 5, the schedule includes a visit to the famous Tiffany Glass Curtain Palace of Fine Arts, Xochimilco, and the bullfight in the afternoon.

Group 1 will leave Mexico City at 11:00 am, Monday, June 6, arriving in Houston at 2:00 pm. **Group 2** will leave at 4:00 pm, arriving in Houston at 8:50 pm with stops in Tampico and Brownsville. Arrangements for those in Group 1 who wish to take the later flight, or in Group 2 who wish to return with Group 1, can be made. Those in Group 2 will have had one less night in Mexico City and will be entitled to a reduction in tour cost or may stay on by arrangement.

Group 3 plus those in Group 2 staying over will take the same sightseeing trip of Mexico City and University City, with luncheon, offered Group 1 on May 30. Group 3 will depart on Tuesday, June 7, leaving Mexico City at 11:00 am and arriving in Houston non-stop at 2:00 pm.

Cost of approximately $245 includes deluxe facilities throughout the trip with luncheons in Mexico City and outside as indicated, meals in flight . . . air transportation between Houston and Mexico City, and Mexico City and Acapulco . . . all transfers between airport and hotels . . . sightseeing and night club tour in Mexico City. Also included are the cost of a Mexican Tourist Card, and Mexican taxes payable in Mexico. Not included are meals in Mexico City (except as indicated above) and the fishing trip which is optional for a limited number.

Those desiring to travel by air to Houston for the Convention, can arrange to include the complete trip to Houston, Mexico City, Acapulco, and return via Houston or some other route, on air line tickets issued by Harvey Travel Bureau. Reservations will be made by the Bureau with convention-goers getting the benefit of any round trip discounts possible.

Sight

CONTINENTAL FOUNDRY & MACHINE CO.

Employee was chipping on a casting when a chip struck the center of his safety goggle lens. He suffered no injury whatsoever.

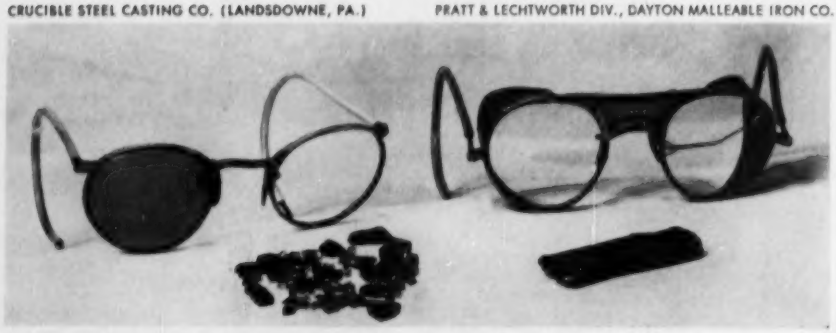
TWO DOZEN REASONS for wearing goggles, safety glasses, and face shields suited to the work being performed are shown on these and the following two pages. These examples of the

STANDARD STEEL WORKS DIV., BALDWIN-LIMA-HAMILTON CORP.

A chip from a ring on which he was working struck the shield just over the eye with such force as to turn the shield about halfway around his head. The man was not injured.

CRUCIBLE STEEL CASTING CO. (LANDSDOWNE, PA.)

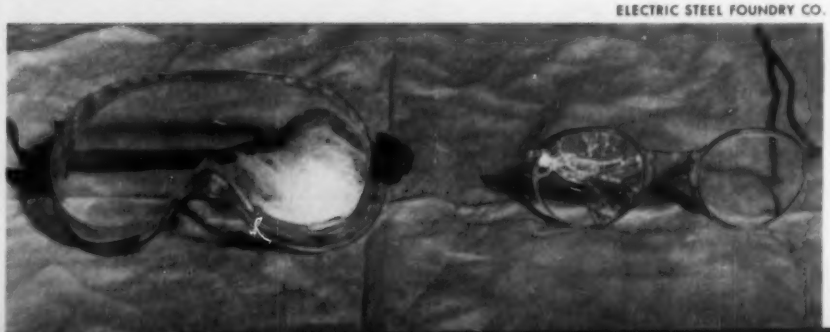
PRATT & LECHTWORTH DIV., DAYTON MALLEABLE IRON CO.



Goggles on the left were struck by an object flying from a sandblast. Pieces of shattered lens were removed from the man's eye; no serious injury resulted. The lens of the goggles at the right was cracked by the tip of a chisel broken while prying scale from a large casting. No injury.

ELECTRIC STEEL FOUNDRY CO.

Shield on the left saved wearer's eye from a piece of broken grinding wheel. Lucky chipper, neglecting to cover safety glasses (right) with regular shield, was uninjured by flying steel fragment.



Savers

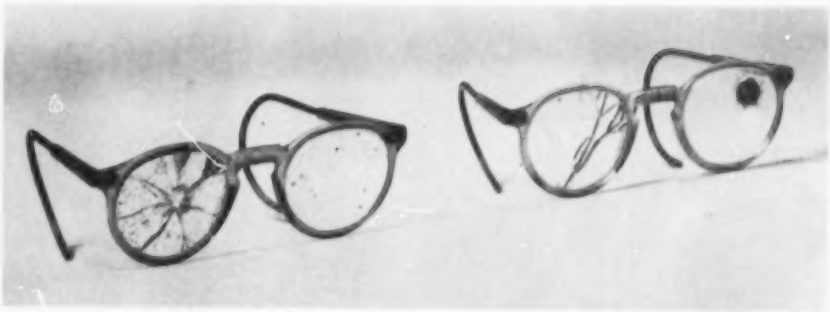
importance of sight savers were exhibited at the 9th annual T & O Conference of the Steel Founders' Society. SFSA safety work is carried on under C. W. Briggs, technical and research director, assisted by Erwin Dieckmann; Safety Committee members are: E. M. Layman, General Steel Castings Corp., *chairman*; C. K. Garland, Massillon Steel Casting Co.; A. W. Nelson, Electric Steel Foundry Co.; A. S. Phelps, Pratt & Letchworth Div., Dayton Malleable Iron Co.; L. L. Bartell, Maynard Electric Steel Casting Co.; H. J. Mullarkey, Continental Foundry & Machine Co.; M. H. Nichter, American Steel Foundries; and C. F. Sweets, Ross-Meehan Foundries.

While breaking up slag in a rock crusher a piece of slag flew striking the operator on the goggle lens. No injury was incurred.

CONTINENTAL FOUNDRY & MACHINE CO.

ELECTRIC STEEL FOUNDRY CO.

This face shield was worn by the operator of an abrasive cut-off machine. He had raised the guard for a certain casting. The wheel pinched and broke. Safer type cut-off wheels are now used. The aluminum skull guard saved the man's life.



A chipping chisel ricochetted into the lens of the safety glasses at the left. Impact caused loose foreign bodies to imbed in right eye. No disability. Glasses on the right were worn by a foreman watching pouring of large mold. A spurt of metal hit his safety glasses. His eye was uninjured.

PRATT & LETCHWORTH DIV., DAYTON MALLEABLE IRON CO.

UNION STEEL CASTINGS DIV., BLAW KNOX CO.

Goggles on the left saved the chipper's left eye from injury by a flying chip. The shot-blast operator was protected from injury by a flying particle by safety goggles on the right.

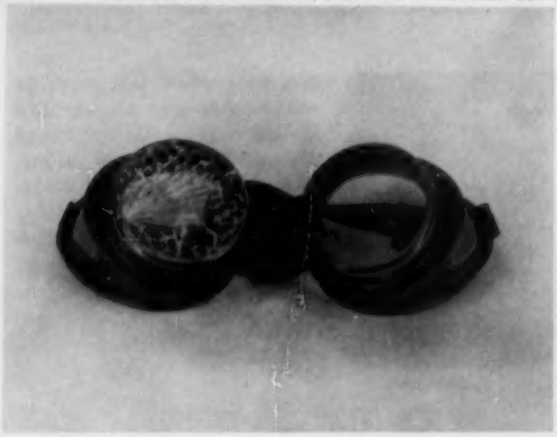
AMERICAN CAST IRON PIPE CO.

Wearer of these was improperly grinding back of the bell of a large diameter pipe when the wheel broke.

AMERICAN CAST IRON PIPE CO.

Safety shield protected the wearer from a piece of broken wheel dresser which was improperly guarded.

STANDARD STEEL WORKS DIV., BALDWIN-LIMA-HAMILTON CORP.



Chipper was wearing this pair of goggles when he was struck by a chip from his chipping hammer.

ELECTRIC STEEL FOUNDRY CO.

Eyes of the man pouring small molds on a conveyor were saved by these glasses from metal backfiring from sprue.

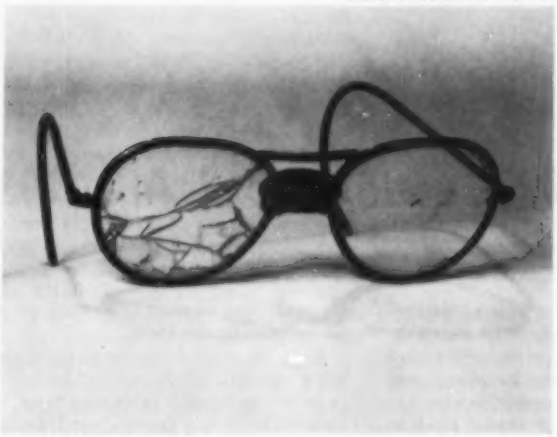
GENERAL STEEL CASTINGS CORP.

Open hearth pit man was breaking up slag he had cooled with water when exploding unsolidified slag caused 3rd degree burns over 50% of his body and 2nd degree burns over 20%. Goggles saved his eyes, probably his life.

GENERAL STEEL CASTINGS CORP.

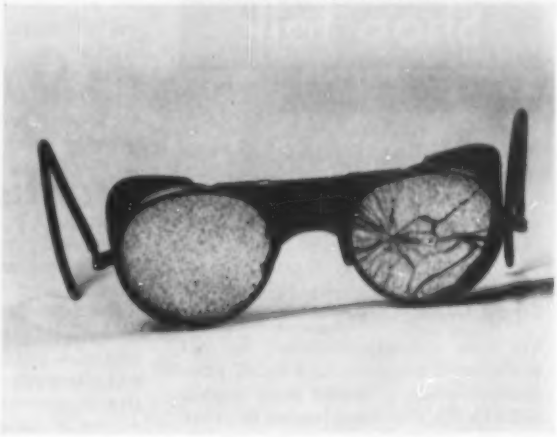
Air hose nipple attachment on the grinder broke and the loose broken end of the nipple struck the operator on the goggles. He received a laceration about ½ in. from the eye; the goggles saved his eye.

EASTERN MALLEABLE IRON CO.



Molder was pouring his molds when he was struck in the face by a splash of iron. His eyes weren't injured.

PRATT & LETCHWORTH DIV., DAYTON MALLEABLE IRON CO.



Flying steel chip cracked the left lens of the chipper's safety goggles but caused no eye injury.

SUPERIOR STEEL & MALLEABLE CASTINGS CO.

Goggles protected the wearer's eye and his own personal glasses from a flying foreign body.

MOUNTAIN STATE STEEL FOUNDRIES, INC.

Molten metal exploding from a wet mold destroyed the pourer's goggle lenses but did not injure his eyes.

KEOKUK STEEL CASTINGS CO.

Inspector was walking through the cleaning room past a shot blast as the door on the machine was being closed. A blast of shot struck him full in the face, but he suffered no injuries to his eyes.

STANDARD STEEL WORKS DIV., BALDWIN-LIMA-HAMILTON CORP.

Employee wearing these safety goggles was struck by a chip from a casting on which he was working. Although the right safety lens was shattered, nothing was found in his eye.

Shop talk

Practical Questions and Answers

Small Cupola Operation

We have recently acquired, for experimental purposes and small production heats, a second hand cupola of 18 in. ID. For some reason or other v/e are running into considerable difficulties, apparently due to metal freezing at the tap hole and chilling on the bottom of the well.

Every step of operation of smaller cupolas must be carried out explicitly to establish optimum conditions for melting. Failure to size materials is the most common oversight. Burning-in the bed is critical because there is a large radiating area relative to the metal column. Use a mild blast if necessary to burn in the bed sufficiently when in a hurry, Walter R. Jaeschke, Whiting Corp., Harvey, Ill., advises.

THE CUPOLA AND ITS OPERATION, published by the American Foundrymen's Society, lists general charging directions for cupolas.

The height of bed coke varies as the square of the blast pressure and should be from 28 to 34 in. above the tuyeres of the 18-in. cupola. Coke should be added in 20-lb charges; 4 lb of flux should be used. Recommended blast is 570 cfm at a normal windbox pressure of 7 oz; blower should be able to deliver 640 cfm at a discharge pressure of 8 oz. Total tuyere area should be 32 sq. in.

Front Slagging Spout

What is necessary to convert our present cupola operation to front slagging? We now rear slag and intermittently tap 6 tons per hr, 8 hr per day. The well diameter is 60 in.; sand bottom to slag hole is about 7 in.

Continuous tapping with a front slagging spout is independent of the melting rate and other dimensions submitted. The one dimension upon which successful front slagging operation depends is the height of the tuyeres above the to$_p$ of the tap hole.

A front slagging spout operates as a U-tube with iron and slag being forced out the tap hole and up into the spout by air and slag pressure inside the cupola.

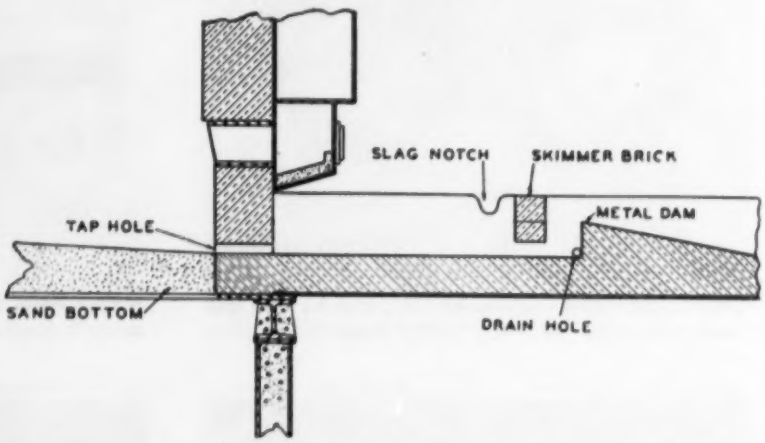
During melting the system is balanced on both sides of the taphole by establishing a metal dam at a height that will allow required metal removal and slag separation. Of course, when operation is slowed by decreased blast or shut down, metal outside the cupola will back into the cupola well until pressures on both sides of the tap hole are equalized. The danger is in raising the slag layer inside the cupola to the point of running into the tuyeres.

The simplest way to determine the optimum metal dam height is to alter by trial and error a dam established at a height calculated in inches to be one-fourth of the maximum expected blast pressure in pounds per square inch. The head of metal in the spout, being higher than the dam by the depth of flow over the dam, should be sufficient to seal the tap hole with metal inside the cupola well to prevent air from blowing through. But the head must not be so great that slag will not flow through the tap hole with the metal.

With a properly designed spout, metal inside the cupola will not rise more than ½ in. above the tap hole during melting, providing an optimum condition for slag removal with the slag layer as far as possible from the tuyeres.

Front slagging spouts have been constructed of ½-in. steel plate reinforced with tie-bars across the dam and at the far end; and of cast iron sections of ¾ to 1-in. in thickness.

Each of several spout designs has some measure for damming the metal to build the head, a skimming brick to hold back the slag layer, a notch in the side of the spout of sufficient depth to remove slag throughout the melting operation, and a hole at the lowest level to drain the cupola and spout of metal and slag at the end of operation. One spout is designed with a side hinge so that it can be unlatched and swung open to allow for draining slag after metal has been removed through the drain hole and the cupola has been dropped.



Cross section of cupola front slagging spout (*Cupola and Its Operation*, page 99).

The metal dam should be about 4 in. wide to facilitate changes to accommodate operating conditions. The trough beyond the metal dam should be narrow. One reference recommends that the depth of metal just ahead of the dam be at least 10 in. to insure separation of slag.

To adjust the dam height of the front slagging spout to operating conditions, note whether slag appears in front of the slag hole within 20 min after the first tap. If no slag appears, lower the dam about ¼-in. and allow time for the liquids to establish themselves at the new level. Repeat this procedure until slag does appear and no adjustment is needed to bring slag from the cupola in sufficient volume to run over the

slag spout in about 10 min after making its first appearance. Be sure to measure the dam height from some fixed point on the spout frame.

It may be necessary to make similar adjustments for a day or two until an average height is reached which allows the cupola to begin slagging in not more than 20 min and will efficiently seal the tap hole from blowing. Adjustments in the dam need not interfere with melting efficiency in any way during the experimental period. Usually the adjustments described do not take more than an hour after the first tap.

With front slagging, no definite relation need exist between the melting rate of the cupola and the size of the tap hole. A 2 in. diameter hole will serve for 5 to 25 tons per hr.

A round tap hole may be used but a rectangular hole with the long dimension in the horizontal plane is considered to offer more resistance to the cutting action of slag. The only way to increase the slag carrying capacity of a rectangular hole, once dam height has been established, is to increase the width of the hole. This also increases its iron-carrying capacity. Increasing the height of the tap hole increases its iron carrying capacity but leaves the slag-carrying capacity unchanged.

Iron-Contaminated Aluminum

Kindly advise us regarding the refining of aluminum scrap that has become contaminated with iron to the extent of 1 per cent or slightly higher. We are using iron and steel pots which are painted with various protective coatings.

There is no method available for taking iron out of aluminum scrap. Gradual consumption of this scrap is accomplished in industry by melting and pigging the high-iron scrap and adding small amounts of contaminated pig to the furnace charge.

You will not pick up appreciable amounts of iron from the pots if they are adequately coated with a suitable wash of whiting, talc, finely ground mica, or an insulating powder especially processed from bauxite.

A mixture suitable for brushing may be made by adding about 7 lb of dry ingredients to each gallon of water. A small amount of sodium silicate may be added to improve adhesion. The coating should be renewed after each cleaning by heating the pot slightly above 212 F and brushing the mixture on its surface to form a continuous film of moderate thickness.

A newly coated pot should be thoroughly preheated to be sure that all moisture is driven off before metal is again charged.

Enclosed is a list of suppliers of washes for aluminum practice.

Low Grade Sand?

We use a sand that is dug locally, but feel that it is a rather low grade, so we make a synthetic sand for facing and back it up with the local sand. How can we find out more about the sand ourselves and whom may we turn to for help?

The FOUNDRY SAND HANDBOOK, published by the American Foundrymen's Society is a most complete reference on all phases of foundry sand testing. AFS members may obtain this book for $3.50 (non-members, $5.25). Postage is prepaid if remittance accompanies order. Write to Book Department, American Foundrymen's Society, Golf & Wolf Roads, Des Plaines, Ill.

You might find it profitable to engage a sand consultant to advise you of necessary changes. Your supplier of bonding materials is in a good position and willing to help you with molding sand problems.

Just Give Us the Facts

Answers to questions and problems submitted to Shop Talk will be more specific, more complete, and prompt if readers will supply details, sketches, drawings, photos, and specimens (where feasible). Receipt of as much information as possible with the first letter will enable the AFS Technical Dept. and the AMERICAN FOUNDRYMAN technical staff to provide the best possible answer without the delay of several exchanges of correspondence

Strainer Cores

We are contemplating using strainer cores and would like to know what you think of this practice in general.

The term "strainer" core is a misnomer in anything but aluminum or magnesium practice; and even then it is misleading because the straining device is actually a metal screen rather than a core. Strainer cores, however, will remove larger pieces of refractory, etc.

For the higher melting point alloys the primary purpose of the strainer core is to restrict the flow of metal and cause the sprue and pouring basin to fill quickly. The pool of molten metal thus formed allows slag to separate and float on the surface during the rest of the pour. Slag separation, of course, depends on the metal pourer keeping the sprue or pouring basin (there should be one) full throughout the pour.

Choking action of the strainer core is temporary because a properly designed gating system will, when filled, provide a greater restriction and thus nullify the strainer action. Choke is temporary. Indeed, perforated metal screen strainers in ferrous work are soon melted by the metal stream.

Severe thermal shock and metal erosion require that special materials and care be used to make strainer cores serviceable.

Sand strainer cores invariably are made by the foundry using them. A typical strainer core mix for ferrous work would be a 25 to 1 (by weight) mixture of washed and dried silica sand and core oil with no water or other binders added. A sand of 70 AFS fineness should give about 200 psi baked tensile strength.

The best that can be expected of sand strainer cores is that the holes be spaced sufficiently so that they will not erode completely before the sprue, pouring basin and gating system are filled.

Ceramic strainer cores, available commercially, stand up throughout the entire pour providing a definite choke and, to the extent that the holes do not enlarge, serve also as a strainer.

Design of sand and ceramic strainer cores is discussed and diagrammed in detail in the 1948 AFS TRANSACTIONS, vol. 56, pp. 574-575 and in AMERICAN FOUNDRYMAN, vol. 13, no. 5, May 1948, pp. 107-108.

Aluminum in Iron Scrap

How serious is the effect of aluminum on cast iron? Our weekly melt is 450 to 475 tons and we are removing between 1500 and 2000 lb of aluminum from the scrap for this melt. It seems to us that the percentage of die cast is so small that it would be burned in the cupola and possibly go out the stack or out with the slag.

It is assumed that the die cast metal you refer to is aluminum; however any nonferrous material should be carefully segregated from the scrap of the cupola charge.

Aluminum is a powerful graphitizer, even in minute quantities. Small quantities of aluminum may be used as ladle additions to serve as a deoxidizer and chill reducer, but anything in excess of the quantity needed for deoxidization is prone to produce pin holes in the casting.

A ton of aluminum in 400 tons of iron (approximately your weekly melt) amounts to ¼ per cent. This is excessive, as aluminum in quantities of 0.05 per cent or even less may be the cause of pin holes in light-sectioned castings poured of soft iron. In larger amounts, it renders the metal sluggish in pouring and causes the formation of dross, resulting in surface defects.

Charging crews can watch for nonferrous attachments and other contamination. A small bonus for such material removed will uncover astonishing quantities of these materials and substantially reduce the possibility of serious difficulty.

Walther

Adams

Taylor

W. D. WALTHER/*Research Engineer*
Ford Motor Co., Dearborn, Mich.

C. M. ADAMS, JR./*Assistant Professor*

H. F. TAYLOR/*Professor, Dept. of Metallurgy*
Massachusetts Institute of Technology

Vacuum Test

Shows Up Gassy Metal

Gassy metal is easy to detect by allowing a small sample from the melt to solidify in a vacuum. The *authors described the method in "Techniques for Improving Strength and Ductility of Aluminum Alloy Castings,"* which they presented before the 1954 Annual Convention of the American Foundrymen's Society.

■ Gas content of aluminum alloy heats can be checked by a reduced pressure test devised by W. A. Baker of England (Journal, Institute of Metals, vol. 71, p. 165, (1945). Essential features of the apparatus (Fig. 1) are a vacuum pump, bell jar, flat plate and rubber gasket upon which the bell jar rests, release valve, connecting rubber tubing, and mercury manometer. The operation is simple and rapid. Molten metal is dipped or poured from the melting crucible into a small thin-walled iron crucible (15 cu in. capacity) which is then placed under the bell jar and the vacuum pump turned on. In less than 20 sec a reduced pressure of about 1/10th atmosphere is reached and the pump turned off. The sample remains under reduced pressure until completely solidified. Pressure is then increased to normal by opening the release valve, and the sample removed from under the bell jar.

The effect of reduced pressure is to exaggerate gas porosity. A given amount of gas will create a bubble

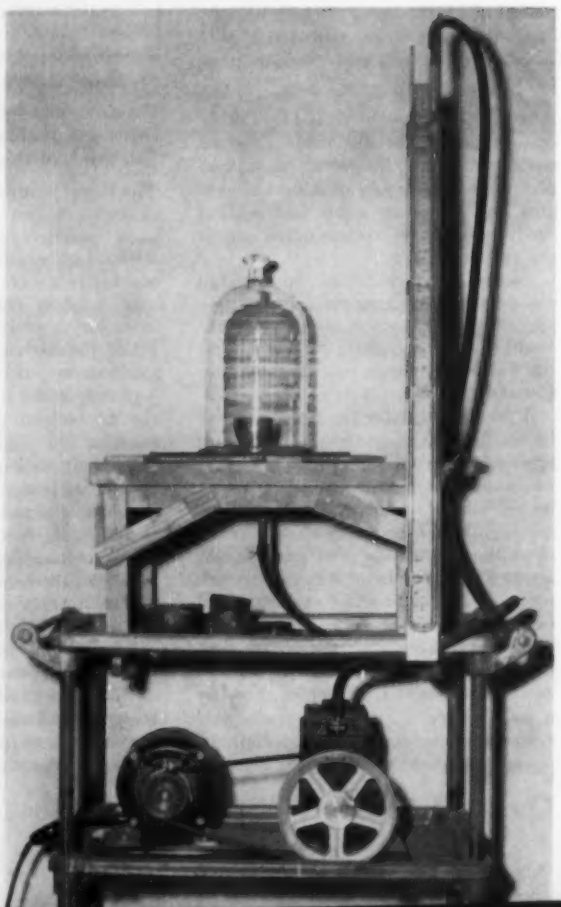


Fig. 1 . . Reduced pressure testing apparatus. Essential features are: vacuum pump, bell jar, flat plate and rubber gasket, and manometer.

ten times as large at 1/10th atmosphere as at one atmosphere. Also, under reduced pressure, bubbles are evolved earlier in the freezing process, and tend to colaesce, further increasing their individual size. Sensitivity of the test depends upon the pressure of operation. Very low pressures (1/100th atmosphere) promote bubble formation in samples of relatively low gas content. At higher operating pressure (½ atmosphere), molten samples containing a significant amount of hydrogen give only a small indication of porosity. Satisfactory operating pressures for aluminum lie between 2 and 4 in. of mercury (absolute pressure). The operating pressure selected should, of course, be maintained constant.

Samples Are Sectioned for Comparison

For comparison and control purposes, samples are sectioned and the sawed surface examined visually. With experience in using the reduced pressure tester, the appearance of the top surface of the test sample will show whether melt quality is satisfactory. By measuring bulk density of the sample, a quantitative evaluation of porosity can be obtained.

The effect of reduced pressure is illustrated in Fig. 2. Two consecutive samples were taken from a heat of aluminum-copper alloy which had not been degassed. Sample 2a was allowed to solidify at atmospheric pressure, while Sample 2b solidified under a pressure of about 1/10th atmosphere. The reduced pressure has magnified the size of the voids in Sample 2b, making them easily visible.

The reduced-pressure test was used to estimate the rate at which molten aluminum absorbs hydrogen from the air; results are shown in Fig. 3. After melting, the metal was degassed with dry nitrogen for 15 min. The crucible was removed from the furnace, and Sample 3a tested for gas content; subsequent tests were taken every 4 min. Figure 3 shows marked hydrogen absorption by the melt. Water vapor in the atmosphere reacted with molten aluminum to give aluminum oxide and hydrogen; the hydrogen was readily absorbed by the melt, to be evolved later during solidification. Solidification under reduced pressure indicated the extent hydrogen was picked up from the atmosphere.

In still another demonstration of the use of this tool, a study was made of hydrogen absorption by aluminum-copper alloy from different mold materials. A green sand mold, a shell mold, a core sand mold and a dry sand mold were used. The melt was degassed and then poured through a long mold cavity (an open ended channel 20 in. long, ¾ in. wide, and ½ in. deep, terminating in a well); this is shown in Fig. 4.

Approximately 3 sec were required for the metal to flow through the cavity into the terminal well. A sample was dipped from the well and solidified under reduced pressure along with the originally degassed metal. This procedure was repeated for each of the four mold materials. Results (Fig. 5) illustrate the rapid pickup of gas from the various sand molds, and give a rough indication of the relative effects of different types of molds. As would be expected, dry sand proved definitely superior, with green sand the greatest source of hydrogen.

An evaluation of effectiveness of degassing, gas pick-

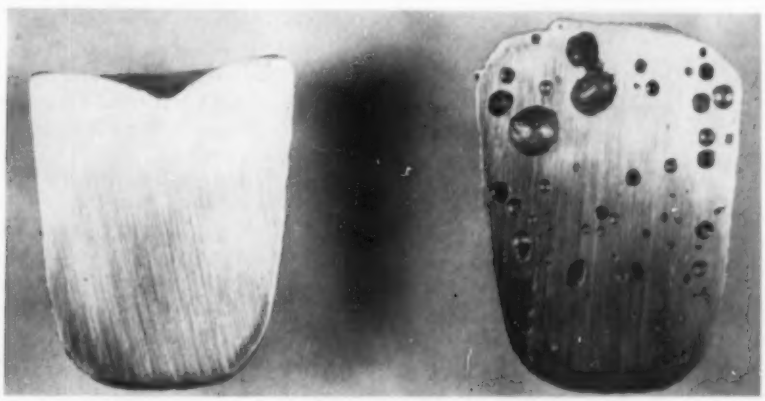
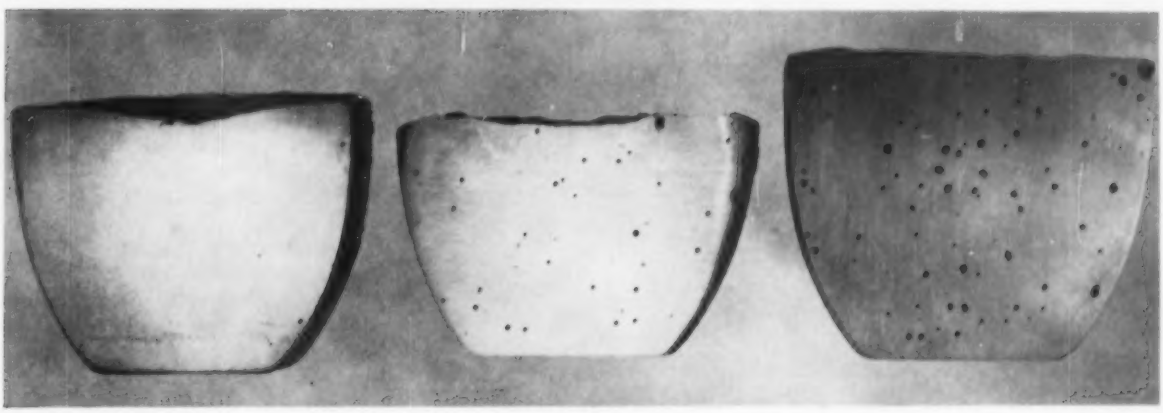
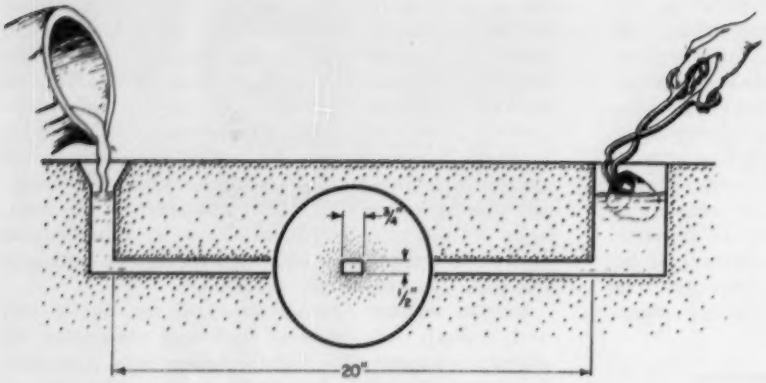


Fig. 2 (left) . . Effects of reduced pressure solidificaiton. Poured from same melt: (left) solidifier under 1.0 atmosphere abs., (right) solidified under 0.13 atmosphere abs. (4-in. Hg).

Fig. 3 (below) . . Hydrogen was absorbed from air by degassed metal held in open ladle. Left, sampled immediately; center, held 4 min., right, held 8 min. before sampling then solidified under 0.067 atmosphere (2-in. Hg).





up from crucible, from handling, and from mold materials, for any particular operation, can easily be evaluated using this apparatus. Studies indicate the reduced pressure test may be used effectively for appraisal of other cast metals.

Fig. 4 (left) . . Channel mold with terminating well from which samples are taken for evaluation of gas pick-up from various molding materials.

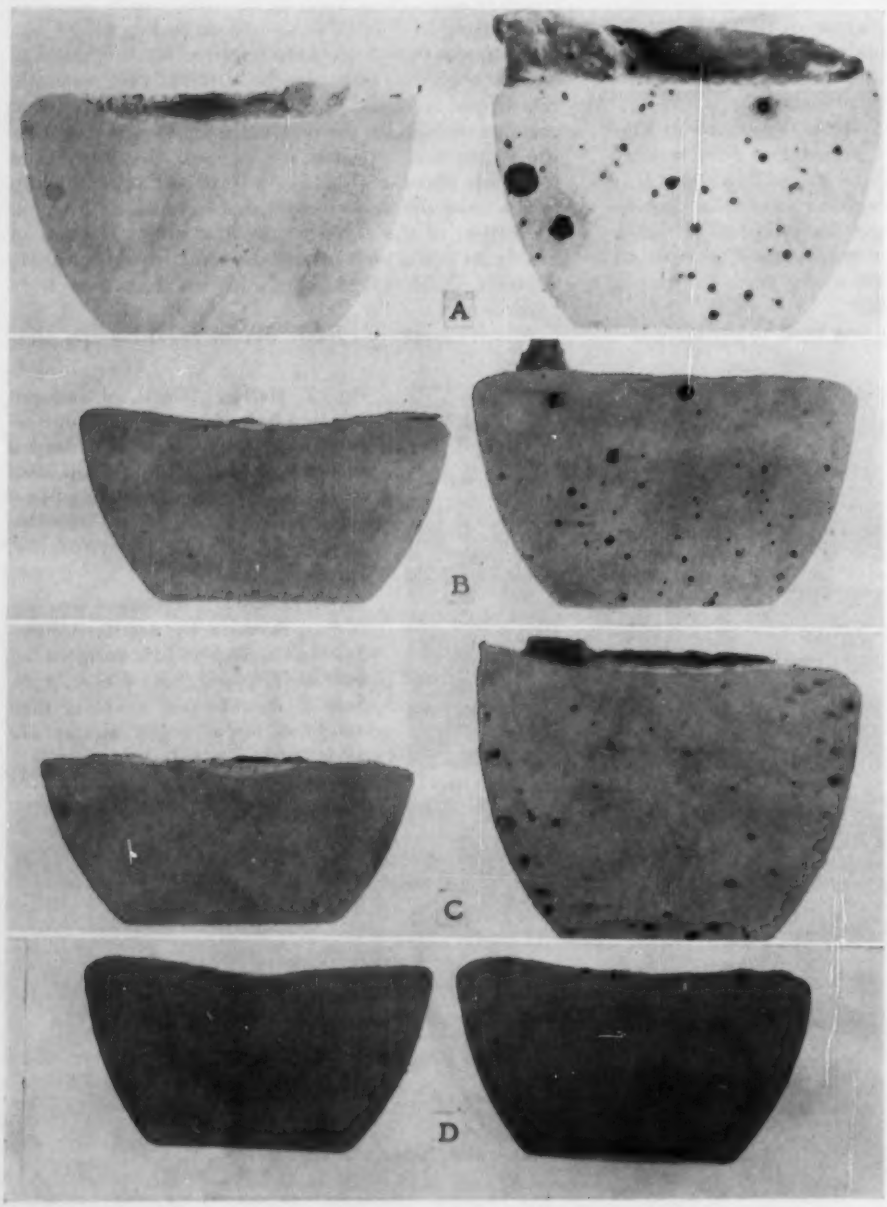


Fig. 5 . . Absorption of hydrogen from different mold materials is shown in these samples solidified under 0.067 atmosphere (2-in. Hg).

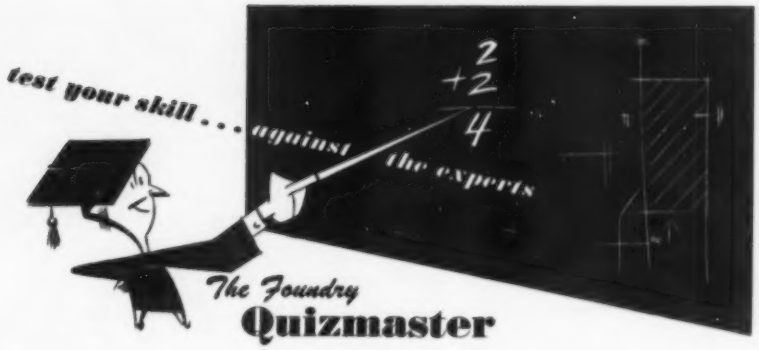
Samples on the left are from degassed metal; those on the right are from the same metal after pouring (see Fig. 4) into:

A . . green sand mold

B . . core sand mold

C . . shell mold

D . . dry sand mold.



Core Mixtures and Mixing

WARNER BISHOP/*Mgr., Foundry Products Div.*
Archer-Daniels-Midland Co., Cleveland

■ The best core is the cheapest core that will do the prescribed job. Thus, it is wise to constantly review the many variables that enter into the production of adequate, economical cores. Control of these variables pays dividends in freedom from worry, reduction of scrap, and production of sound castings. Test your knowledge of cores with the following questions. Answers are on page 92.

1. If two base sands of different origin have the same AFS grain fineness number, the physical properties of the resulting cores are the same. True_____. False_____.

2. The main influence of clay on core sand is to increase the green strength. True_____. False_____.

3. If a given core sand containing an accurately controlled amount of binder and water is run batch after batch, the resultant green compression strength and baked tensile strength will be constant. True_____. False_____.

4. Core oil weighs 7½ lb per gal. True_____. False_____.

5. "Lightweight" cereal weighs half as much as "heavyweight" cereal. True._____ False_____.

6. Volume measurement is the best way to control the amount of sand in a core mix. True_____. False_____.

7. The sequence in which ingredients are added to a core sand mixture is of little importance in the ultimate green compression and baked tensile strength of that mix. True_____. False_____.

8. The moisture content of a mixture consisting of sand, cereal, core oil, and water has no effect upon the ultimate baked strength of cores made from that mix. True_____. False_____.

9. The moisture content of a mixture consisting of sand, cereal, core oil, and water has a great effect upon the green strength of cores made from that mix. True_____. False_____.

10. The moisture content of a core sand mix definitely affects the speed of bake of that mix. True_____. False_____.

11. The best way to increase the baked tensile strength of a core sand mixture is to add more core oil. True_____. False_____.

12. The best way to reduce penetration of metal into a core is to use a stronger core oil. True_____. False_____.

13. The best way to increase the green bond of a core sand mixture is to add cereal. True_____. False_____.

14. Some core oils add more green bond to a core sand mixture than do others. True_____. False_____.

15. The best way to increase the collapsibility of a core is to use a core oil with better collapsibility characteristics. True_____. False_____.

16. The best way to increase the speed of bake of a given core is to raise the oven temperature above 500 F. True_____. False_____.

17. There is no correlation between the speed of attainment of tensile strength of a given core and the speed with which the sand mixture will bake through a heavy chunk core. True_____. False_____.

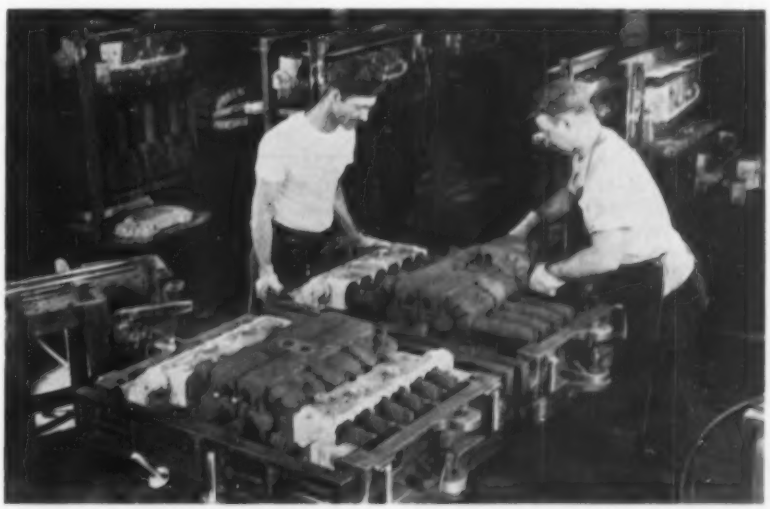
18. The best way to reduce gas formation during pouring is to change the type of binder used. True_____. False_____.

19. The type of core binder can be a minor factor in the ultimate tensile strength of a core. True_____. False_____.

20. Spraying cores with moisture before they enter the oven contributes little to core properties. True_____. False_____.

21. There are faster baking core binders than phenol formaldehyde resins. True_____. False_____.

22. Cereal binders in core sand mixtures serve no other purpose than giving the core green strength. True_____. False_____.



Assembling cylinder block cores in the core room of Studebaker Corporation

Release Gray Iron Statistics

THE 1954 survey of the Gray Iron Founders' Society, based on a record participation of 826 foundries, has been released. Covering average monthly shipments of 288,913 net tons of gray iron made the last half of 1953, the survey represents approximately 60 per cent of the shipments of jobbing or "for sale" castings, and approximately 20 per cent of the captive or "own use" castings made by all gray iron foundries.

Statistics reported include: comparison of production with 1951; division into jobbing and captive tonnage; size of foundry as indicated by number of employees; major molding facilities; degree of mechanization; special facilities; melting units; iron compositions available; and a breakdown by type of industry that consumed the castings and the number of foundries that served those industries.

Average monthly shipments made by the foundries surveyed compare the second half of 1953 (most recent representative period) with the first half of 1951 (best production period to date). For July-December 1953, average monthly shipments were: 173,116 net tons (59.9 per cent) by jobbing foundries; 84,013 net tons (29.1 per cent) by captive foundries; and 31,784 net tons (11.0 per cent) by semi-captive foundries. Figures for January-June are: jobbing—213,389 net tons (61.2 per cent); captive—102,459 net tons (29.4 per cent); semi-captive—32,994 net tons (9.4 per cent).

Jobbing-Captive Tonnage. A detailed

Table 1. . Division of Foundries by Size

Foundry Size by Number of Employees	Foundries in Each Group		Tonnage Produced in Each Group		Estimated Employees	
	No.	% of Total Reporting	Tons	% of Total Tonnage	No.	% of Total
Under 20	146	17.7	5,879	2.0	2,190	2.5
20-49	231	28.0	24,359	8.4	8,085	9.3
50-99	220	26.7	43,091	14.9	16,500	18.9
100-199	132	16.0	61,975	21.5	19,800	22.8
200-299	51	6.2	44,365	15.4	12,750	14.7
300-499	28	3.4	43,976	15.2	11,200	12.9
500-999	10	1.2	35,032	12.1	7,500	8.6
1,000 and over	6	0.8	30,236	10.5	9,000	10.3
	824	100	288,913	100	87,025	100

Table 2. . Degree of Mechanization

Foundry Size by Number of Employees	Mechanized		Part. Mechanized		Not Mechanized	
	% Total Tonnage in Group	% Total No. in Group	% Total Tonnage in Group	% Total No. in Group	% Total Tonnage in Group	% Total No. in Group
Under 20	0	0	7.1	5.6	92.9	94.4
20-49	1.5	1.3	4.8	5.0	93.7	93.7
50-99	5.7	5.1	10.2	7.8	84.1	87.1
100-199	22.4	13.6	17.1	18.9	60.5	67.5
200-299	15.2	15.7	44.2	35.3	40.6	49.0
300-499	57.4	42.9	29.5	32.1	13.1	25.0
500-999	62.6	30.0	5.4	20.0	32.4	50.0
1,000 and over	100	100	0	0	0	0

study of the semi-captive group was made to allocate castings produced into "for sale" and "own use" categories. Recapitulation of 1953 figures shows 66 per cent of the tonnage surveyed falls under the heading of jobbing, 34 per cent under captive.

Size by number of employees is shown for 824 of the foundries surveyed in Table 1. Also indicated is the tonnage produced by the various size groups and the estimated number of employees in the groups.

Mechanization of 811 foundries reporting is shown in Table 2. Direct relation between size and degree of mechanization is well marked, as is the relation between number of foundries in the three mechanization categories and the proportion of the tonnage they produce. The latter correlation doesn't hold, however, in the 300-499 and 500-999 employee brackets.

Special facilities of the 826 foundries show that the following are available at the percentage of foundries indicated:

Centrifugal Casting	2.06%
Permanent Mold Casting	2.80%
Shell Mold Casting	6.05%
Pattern Shop (commercial sales)	24.70%
Pattern Shop (repair and maintenance)	66.71%
Heat Treating	21.43%
Laboratory	24.82%
Machine Shop	47.22%

Molding facilities are shown in Table 3 which indicates the number of foundries in the various size (by employees) groups that have equipment for floor, squeezer, bench, rollover, and stripper molding. Of 824 foundries reporting, 76 or 9.2 per cent make molds by all five methods.

Melting units used were reported by all 826 foundries:

	No.	%
Cupolas	804	97.3
Electric Furnaces	48	5.8
Air Furnaces	15	1.8
Other	22	2.7

Iron compositions available from the 826 foundries were reported under three categories—straight gray iron, up to 3 per cent alloy, over 3 per cent alloy—with a breakdown by melting unit under each category. Many foundries reported using two or more types of units, thus the overlapping.

Straight Gray Iron, 773 or 94 per cent: 702 have cupolas, 39 have electric furnaces, 13 have air furnaces, 19 have other units.

3 per cent Alloy Irons, 428 or 52 per cent: 376 have cupolas, 30 have electric furnaces, nine have air furnaces, 13 have other units.

Over 3 per cent Alloy Irons, 165 or 20 per cent: 128 have cupolas, 26 have electric furnaces, five have air furnaces, six have other units.

Major markets that absorbed 83 per cent of the tonnage of the 826 reporting foundries are shown in Table 4. Indicated are the proportion of the tonnage consumed by the various markets and the ranking of these markets by number of foundries serving them. Table 4 shows that over a quarter of the tonnage went into automotive production and that over a fifth of the foundries made automotive castings. Although only a sixteenth of the tonnage went into general machinery, over half of the foundries produced machinery castings.

Table 3. . Major Molding Facilities

Employee Size Group	No. Fdries. in Group	Floor	Squeezer	Bench	Rollover	Stripper
Under 20	146	110	52	66	20	6
		17.3%	11.4%	15.5%	5.9%	4.3%
20-49	231	182	151	123	86	18
		28.6%	29.3%	28.8%	25.7%	12.8%
50-99	220	171	149	121	97	43
		27.0%	28.9%	28.4%	28.9%	30.5%
100-199	132	100	88	78	71	34
		15.8%	17.1%	18.3%	21.1%	24.1%
200-299	51	41	39	25	35	20
		6.5%	7.6%	5.9%	10.4%	14.2%
300-499	28	21	20	11	19	13
		3.3%	3.9%	2.6%	5.6%	9.2%
500-999	10	8	6	2	5	3
		1.3%	1.2%	0.5%	1.5%	2.1%
Over 1,000	6	1	3	0	3	4
		0.2%	0.6%	0.0%	0.9%	2.8%
	824	634	515	426	336	141
		100%	100%	100%	100%	100%
PERCENTAGE Distribution of Molding Facilities of 824 Foundries		76.9%	62.5%	51.7%	40.8%	17.1%

Table 4. . Gray Iron Foundries' Major Consuming Industries

Industry	% of Total 1953 Tons Consumed by Industry	% by Number Foundries Serving Industry	Rank by Number Foundries Serving Industry
Automotive (inc. repl. parts)	26.16	21.79	7
Building and Construction	9.54	31.60	4
Utilities	8.53	15.86	11
Machine Tool	7.57	38.26	2
Agricultural	6.74	31.11	5
Rolling Mill—Steel Plants	6.72	11.14	22
General Machinery	6.43	52.30	1
Household Appliances	4.73	13.68	16
Heating (including domestic, commercial & industrial heat treating)	3.52	24.70	6
Petroleum Industry	2.43	14.65	13
Municipal Castings	1.52	21.31	8
Power Transmission	1.46	10.77	24
Electrical Motors & Parts	1.37	16.22	10
Paper Making Machinery	1.13	14.53	14
Material Handling	1.07	15.74	12
Machine Shop (jobbers)	0.95	32.08	3
Textile Machinery	0.88	13.56	17
Chemical	0.84	14.29	15
Stone, Clay, Glass Products	0.80	11.62	20
Hardware	0.78	12.71	18
Electrical (other than motors)	0.75	11.86	19
Printing Machinery	0.75	11.50	21
Food Machinery	0.71	17.43	9
Mining & Refining of Metals	0.68	9.20	25
Railroads	0.55	11.02	23
Shipbuilding	0.37	6.54	28
Coal & Coke Industry	0.30	8.96	26
Aircraft	0.30	7.75	27
Furniture & Fixtures	0.27	4.96	30
Other U. S. Government	0.27	4.96	30
Office Equipment	0.14	2.78	31
Toy Manufacturers	0.04	2.18	32
Other Classifications	1.32	6.90	—
U. S. Military—End Users (Includes mention of work performed during World War II)	0.38	62.47	—

FEF to Link Education and Casting Sales

The eighth annual College-Industry Conference of the Foundry Educational Foundation will be held on March 9 and 10 at the Hotel Cleveland, Cleveland, Ohio.

Conference theme, the role of engineering education in the sales and market areas of the cast metals industry, will be discussed by a panel of foundrymen on the second day of conference—Industry Day.

Featured the first day—University Day—will be descriptions by faculty members of developments in course material, laboratories, and instructional techniques. The annual meeting of the Foundation will also be held the first day.

University Day

WEDNESDAY, MARCH 9

Chairman — E. C. Hoenicke, Eaton Mfg. Co., Fdy. Div., Detroit.

8:30 am..REGISTRATION. Assembly Room, "A" Mezzanine.

9.00 am..COMMITTEE MEETINGS.
Board of Trustees (1954-55).
Industry Advisory Committee Chairmen.
University Advisory Committee.
Technical Advisory Committee.

10:30 am..ADDRESS OF WELCOME. Thomas Kaveny, Jr., Herman Pneumatic Machine Co., Pittsburgh, Pa.

10:45 am..KEYNOTE ADDRESS. *"Molding Your Future,"* J. H. Smith, Central Foundry Div., General Motors Corp., Saginaw, Mich.

11:15 am..*"A Classroom Presentation of an Industrial Process,"* Harold A. Montgomery, Purdue University.

12:00 noon..LUNCH.

1:00 pm..*"New Curricula in Metallurgical and Mechanical Engineering at Michigan State College,"* Dr. Austen J. Smith, Michigan State College.

"The Foundry Laboratory for Process Control, Time Study, and Methods Evaluation," Dr. D. C. Williams, Ohio State University.

"Industrial Research as a Tool in Foundry Education," Asst. Prof. Clyde M. Adams, Jr., Massachusetts Institute of Technology.

"College Training and Industry Needs for Engineers," Dr. L. F. Mondolfo, Illinois Institute of Technology.

"Future Direction of Foundry Education at Case," Assoc. Prof. J. F. Wallace, Case Institute of Technology.

"Statistical Inference as a Basic Discipline in Industrial Engineering Curriculum at Penn State," Asst. Prof. David C. Ekey, Pennsylvania State University.

3:00 pm..ANNUAL MEETING.
Report of President Thomas Kaveny, Jr.
Report of Secretary-Treasurer E. M. Knapp, Ferro Machine & Foundry, Inc., Cleveland.
Report of Nominating Committee Chairman Stowell C. Wasson, National Malleable & Steel Castings Co., Cleveland.
Election of Trustees.

4:00 pm..TRUSTEES MEETING (1955-56).

6:00 pm..RECEPTION.

6:45 pm..BANQUET. M. J. Allen, American Steel Foundries, Chicago, presiding.
Principal Speaker, Dr. T. Keith Glennan, Case Institute of Technology.

Industry Day

THURSDAY, MARCH 10

Chairman—Thomas Kaveny, Jr.

9:30 am..RECOMMENDATION OF COMMITTEES.
University Advisory Committee.
Technical Advisory Committee.
Industry Advisory Committee Chairmen.

10:00 am..PANEL. *"Sales and Market Aspects of Engineering Education in Cast Metals,"* M. J. Allen, American Steel Foundries, chairman; Collins L. Carter, Albion Malleable Iron Co., Albion, Mich.; R. L. Gilmore, Superior Steel & Malleable Castings Co., Benton Harbor, Mich.; C. H. Ker, Dalton Foundries, Inc., Warsaw, Ind.; R. B. Parker, American Brake Shoe Co., New York; and Stowell C. Wasson.

12:00 noon..LUNCH.

1:00 pm..*"Properly Engineered Castings,"* W. G. Ferrell, Auto Specialties Mfg. Co., Benton Harbor, Mich.

1:30 pm..Comments by former F.E.F. scholarship holders: Alton W. Bardeen (Case '51) Ohio Brass Co., Mansfield, Ohio; and Richard H. Dobbins (Michigan State '51) Albion Malleable Iron Co.

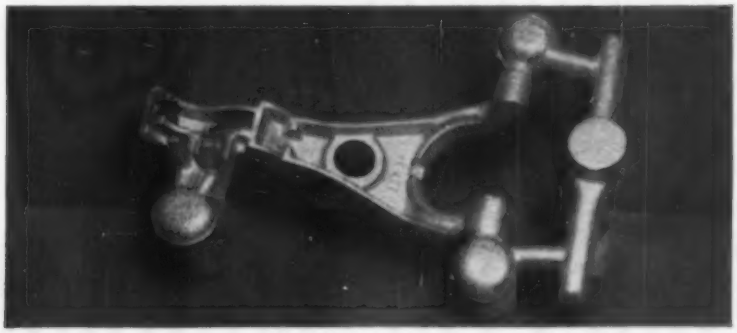
2:00 pm..*"The Future and the Foundry Educational Foundation,"* E. C. Hoenicke.

2:30 pm..CONFERENCE SUMMARY and RECOMMENDATIONS, Prof. E. R. Shorey, University of Wisconsin.

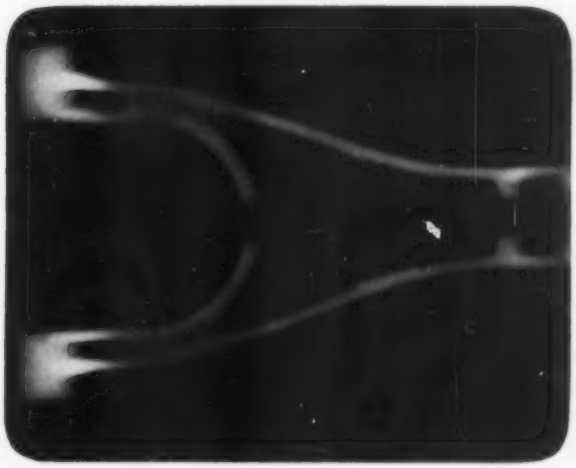
Cornell University F. E. F. Advisory Committee

Cornell F.E.F. Advisory Committee at a recent meeting at Ithaca, N. Y., front row, left to right: M. L. Harper, Cornell University; M. S. Burton, Cornell University; R. P. Brewer, Symington Gould Corp.; F.E.F. President Thomas Kaveny, Jr., Herman Pneumatic Machine Co.; F.E.F. Executive Director E. J. Walsh, and R. W. Crannell, Lehigh Foundries. Second row, left to right: C. W. Mason, Cornell University; Keith Williams, Pratt & Letchworth Co.; A. C. Ross, Worthington Corp.; D. J. Joyce, Cornell University; G. F. Hodgson, Doehler-Jarvis Div., National Lead Co., and G. S. Diamond, Electro Refractories & Abrasives Corp. Top row, left to right: A. B. Norton, Aluminum Co. of America; Robert Minnear, Ingersoll-Rand; Thomas Walker, U. S. Pipe & Foundry Co.; Hamilton Garnsey, Goulds Pumps; D. J. Merwin, Oriskany Malleable Iron Co., and A. F. Crone, Acme Steel & Malleable Iron Works.

Shrink steals strength — and profits



— RADIOGRAPHY points the way to avoid it



THIS steel fork lever was designed to take a specific load. Would it hold up? Not if shrinkage had robbed its strength.

But here is where radiography came in with double-barreled effect. First the radiographs which were made showed the foundryman that internal shrinkage was present. Then the radiographs disclosed a recurring pattern of these defects, thus suggesting a change in molding which greatly reduced the difficulty.

This is typical of the ways radiography helps the foundryman make sure only satisfactory work is delivered and so builds a reputation for high-quality castings.

* * *

If you'd like to know how it can improve your own operations, talk it over with your x-ray dealer. Or, if you like, write us for a free copy of "Radiography as a Foundry Tool."

EASTMAN KODAK COMPANY, X-RAY DIVISION, ROCHESTER 4, N. Y.

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Foundry Facts

Pig Iron Specifications

Based on *Steel Products Manual, Section 1*, of the American Iron & Steel Institute. Second half will appear in the March issue.

Prefix Letter Designations. For convenience of reference herein, a prefix letter is used which designates grades in order of increasing phosphorus content, as follows:

Code	*Designation*	*Phosphorus Content, %*
B	Basic—Northern	0.400 max.
Fl	Foundry—Northern, low phosphorus	0.300 to 0.500
Fh	Foundry—Northern, high phosphorus	0.501 to 0.700
Fs	Foundry—Southern	0.700 to 0.900
Bs	Basic—Southern	0.700 to 0.900
S	Silvery	0.300 max.

B Phosphorus 0.400 (Table 5), Maximum, and Bs Phosphorus 0.700 to 0.900 (Table 6) are used in making steel by the basic open hearth process. They are characterized by a low silicon limit and a considerably higher phosphorus content than is tolerable in the Bes class. Phosphorus can be largely eliminated in the basic open hearth process of steelmaking. Iron made in the southern districts differs in phosphorus and manganese content from that made in the northern districts because of natural differences in available raw materials.

Table 5 . . Basic—Northern Iron

Grade Designation	Composition, per cent			
	Si	S Max.	P Max.	Mn
B 100125sm	1.00 max.	0.05	0.400	1.01/1.50
B 113125m	1.01/1.25	0.05	0.400	1.01/1.50
B 138125m	1.26/1.50	0.05	0.400	1.01/1.50
B 100175sm	1.00 max.	0.05	0.400	1.51/2.00
B 113175m	1.01/1.25	0.05	0.400	1.51/2.00
B 138175m	1.26/1.50	0.05	0.400	1.51/2.00

Table 6 . . Basic—Southern Iron

Grade Designation	Composition, per cent			
	Si	S Max.	P	Mn
Bs 100058sm	1.00 max.	0.05	0.700/0.900	0.40/0.75
Bs 113058m	1.01/1.25	0.05	0.700/0.900	0.40/0.75
Bs 138058m	1.26/1.50	0.05	0.700/0.900	0.40/0.75

Fl Phosphorus 0.300 to 0.500 (Table 7), Fh Phosphorus 0.501 to 0.700 (Table 8), and Fs Phosphorus 0.700 to 0.900 (Table 9) in combination with iron and steel scrap and alloying elements are used for making iron castings by a remelting process in a very wide range of types and sizes. For example, castings requiring density of grain and good strength for steam and hydraulic cylinders, machine tools, dies, and similar uses; chilled castings such as rolls; heavy castings not to be machined; miscellaneous light and heavy castings which are to be machined, and light thin castings such as stove plate, radiator castings, plumbing supplies, and hardware specialties. The blending of several grades of iron to obtain desired composition in finished castings is common practice.

Table 7 . . Foundry—Northern, Low Phosphorus Iron

Grade Designation	Composition, per cent			
	Si	S Max.	P	Mn
Fl 175063s	1.75 max.	0.05	0.300/0.500	0.50/0.75
Fl 188063	1.76/2.00	0.05	0.300/0.500	0.50/0.75
Fl 213063	2.01/2.25	0.05	0.300/0.500	0.50/0.75
Fl 238063	2.26/2.50	0.05	0.300/0.500	0.50/0.75
Fl 263063	2.51/2.75	0.05	0.300/0.500	0.50/0.75
Fl 288063	2.76/3.00	0.05	0.300/0.500	0.50/0.75
Fl 313063	3.01/3.25	0.05	0.300/0.500	0.50/0.75
Fl 338063	3.26/3.50	0.05	0.300/0.500	0.50/0.75
Fl 175088s	1.75 max.	0.05	0.300/0.500	0.76/1.00
Fl 188088	1.76/2.00	0.05	0.300/0.500	0.76/1.00
Fl 213088	2.01/2.25	0.05	0.300/0.500	0.76/1.00
Fl 238088	2.26/2.50	0.05	0.300/0.500	0.76/1.00
Fl 263088	2.51/2.75	0.05	0.300/0.500	0.76/1.00
Fl 288088	2.76/3.00	0.05	0.300/0.500	0.76/1.00
Fl 313088	3.01/3.25	0.05	0.300/0.500	0.76/1.00
Fl 338088	3.26/3.50	0.05	0.300/0.500	0.76/1.00
Fl 175113s	1.75 max.	0.05	0.300/0.500	1.01/1.25
Fl 188113	1.76/2.00	0.05	0.300/0.500	1.01/1.25
Fl 213113	2.01/2.25	0.05	0.300/0.500	1.01/1.25
Fl 238113	2.26/2.50	0.05	0.300/0.500	1.01/1.25
Fl 263113	2.51/2.75	0.05	0.300/0.500	1.01/1.25
Fl 288113	2.76/3.00	0.05	0.300/0.500	1.01/1.25
Fl 313113	3.01/3.25	0.05	0.300/0.500	1.01/1.25
Fl 338113	3.26/3.50	0.05	0.300/0.500	1.01/1.25

Table 8 . . Foundry—Northern, High Phosphorus Iron

Grade Designation	Composition, per cent			
	Si	S Max.	P	Mn
Fh 175063s	1.75 max.	0.05	0.501/0.700	0.50/0.75
Fh 188063	1.76/2.00	0.05	0.501/0.700	0.50/0.75
Fh 213063	2.01/2.25	0.05	0.501/0.700	0.50/0.75
Fh 238063	2.26/2.50	0.05	0.501/0.700	0.50/0.75
Fh 263063	2.51/2.75	0.05	0.501/0.700	0.50/0.75
Fh 288063	2.76/3.00	0.05	0.501/0.700	0.50/0.75
Fh 313063	3.01/3.25	0.05	0.501/0.700	0.50/0.75
Fh 338063	3.26/3.50	0.05	0.501/0.700	0.50/0.75
Fh 175088s	1.75 max.	0.05	0.501/0.700	0.76/1.00
Fh 188088	1.76/2.00	0.05	0.501/0.700	0.76/1.00
Fh 213088	2.01/2.25	0.05	0.501/0.700	0.76/1.00
Fh 238088	2.26/2.50	0.05	0.501/0.700	0.76/1.00
Fh 263088	2.51/2.75	0.05	0.501/0.700	0.76/1.00
Fh 288088	2.76/3.00	0.05	0.501/0.700	0.76/1.00
Fh 313088	3.01/3.25	0.05	0.501/0.700	0.76/1.00
Fh 338088	3.26/3.50	0.05	0.501/0.700	0.76/1.00
Fh 175113s	1.75 max.	0.05	0.501/0.700	1.01/1.25
Fh 188113	1.76/2.00	0.05	0.501/0.700	1.01/1.25
Fh 213113	2.01/2.25	0.05	0.501/0.700	1.01/1.25
Fh 238113	2.26/2.50	0.05	0.501/0.700	1.01/1.25
Fh 263113	2.51/2.75	0.05	0.501/0.700	1.01/1.25
Fh 288113	2.76/3.00	0.05	0.501/0.700	1.01/1.25
Fh 313113	3.01/3.25	0.05	0.501/0.700	1.01/1.25
Fh 338113	3.26/3.50	0.05	0.501/0.700	1.01/1.25

Table 9 . . Foundry—Southern Iron

Grade Designation	Composition, per cent			
	Si	S Max.	P	Mn
Fs 175063s	1.75 max.	0.05	0.700/0.900	0.40/0.75
Fs 188063	1.76/2.00	0.05	0.700/0.900	0.40/0.75
Fs 213063	2.01/2.25	0.05	0.700/0.900	0.40/0.75
Fs 238063	2.26/2.50	0.05	0.700/0.900	0.40/0.75
Fs 263063	2.51/2.75	0.05	0.700/0.900	0.40/0.75
Fs 288063	2.76/3.00	0.05	0.700/0.900	0.40/0.75
Fs 313063	3.01/3.25	0.05	0.700/0.900	0.40/0.75
Fs 338063	3.26/3.50	0.05	0.700/0.900	0.40/0.75

Pig Iron Specifications

S Phosphorus 0.300 (Table 10), Maximum is used for the introduction of silicon into steel or cast iron. The term "silvery" comes from the old fracture nomenclature, and reflects a quality due to high silicon content.

Table 10 . . Silvery Iron

Grade Designation	Composition, per cent			
	Si	S Max.	P Max.	Mn
S 525100	5.00/5.50	0.05	0.300	1.00 Max.
S 575100	5.51/6.00	0.05	0.300	1.00 Max.
S 625100	6.01/6.50	0.05	0.300	1.00 Max.
S 675100	6.51/7.00	0.05	0.300	1.00 Max.
S 725100	7.01/7.50	0.05	0.300	1.00 Max.
S 775100	7.51/8.00	0.05	0.300	1.00 Max.
S 825100	8.01/8.50	0.05	0.300	1.00 Max.
S 875100	8.51/9.00	0.05	0.300	1.00 Max.
S 925100	9.01/9.50	0.05	0.300	1.00 Max.
S 975100	9.51/10.00	0.05	0.300	1.00 Max.
S 1025100	10.01/10.50	0.05	0.300	1.00 Max.
S 1075100	10.51/11.00	0.05	0.300	1.00 Max.
S 1125100	11.01/11.50	0.05	0.300	1.00 Max.
S 1175100	11.51/12.00	0.05	0.300	1.00 Max.
S 1225100	12.01/12.50	0.05	0.300	1.00 Max.
S 1275100	12.51/13.00	0.05	0.300	1.00 Max.
S 1325100	13.01/13.50	0.05	0.300	1.00 Max.
S 1375100	13.51/14.00	0.05	0.300	1.00 Max.
S 1425100	14.01/14.50	0.05	0.300	1.00 Max.
S 1475100	14.51/15.00	0.05	0.300	1.00 Max.
S 1525100	15.01/15.50	0.05	0.300	1.00 Max.
S 1575100	15.51/16.00	0.05	0.300	1.00 Max.
S 1625100	16.01/16.50	0.05	0.300	1.00 Max.
S 1675100	16.51/17.00	0.05	0.300	1.00 Max.
S 525125	5.00/5.50	0.05	0.300	1.01/1.50
S 575125	5.51/6.00	0.05	0.300	1.01/1.50
S 625125	6.01/6.50	0.05	0.300	1.01/1.50
S 675125	6.51/7.00	0.05	0.300	1.01/1.50
S 725125	7.01/7.50	0.05	0.300	1.01/1.50
S 775125	7.51/8.00	0.05	0.300	1.01/1.50
S 825125	8.01/8.50	0.05	0.300	1.01/1.50
S 875125	8.51/9.00	0.05	0.300	1.01/1.50
S 925125	9.01/9.50	0.05	0.300	1.01/1.50
S 975125	9.51/10.00	0.05	0.300	1.01/1.50
S 1025125	10.01/10.50	0.05	0.300	1.01/1.50
S 1075125	10.51/11.00	0.05	0.300	1.01/1.50
S 1125125	11.01/11.50	0.05	0.300	1.01/1.50

Table 10 (Cont'd)

Grade Designation	Composition, per cent			
	Si	S Max.	P Max.	Mn
S 1175125	11.51/12.00	0.05	0.300	1.01/1.50
S 1225125	12.01/12.50	0.05	0.300	1.01/1.50
S 1275125	12.51/13.00	0.05	0.300	1.01/1.50
S 1325125	13.01/13.50	0.05	0.300	1.01/1.50
S 1375125	13.51/14.00	0.05	0.300	1.01/1.50
S 1425125	14.01/14.50	0.05	0.300	1.01/1.50
S 1475125	14.51/15.00	0.05	0.300	1.01/1.50
S 1525125	15.01/15.50	0.05	0.300	1.01/1.50
S 1575125	15.51/16.00	0.05	0.300	1.01/1.50
S 1625125	16.01/16.50	0.05	0.300	1.01/1.50
S 1675125	16.51/17.00	0.05	0.300	1.01/1.50
S 525175	5.00/5.50	0.05	0.300	1.51/2.00
S 575175	5.51/6.00	0.05	0.300	1.51/2.00
S 625175	6.01/6.50	0.05	0.300	1.51/2.00
S 675175	6.51/7.00	0.05	0.300	1.51/2.00
S 725175	7.01/7.50	0.05	0.300	1.51/2.00
S 775175	7.51/8.00	0.05	0.300	1.51/2.00
S 825175	8.01/8.50	0.05	0.300	1.51/2.00
S 875175	8.51/9.00	0.05	0.300	1.51/2.00
S 925175	9.01/9.50	0.05	0.300	1.51/2.00
S 975175	9.51/10.00	0.05	0.300	1.51/2.00
S 1025175	10.01/10.50	0.05	0.300	1.51/2.00
S 1075175	10.51/11.00	0.05	0.300	1.51/2.00
S 1125175	11.01/11.50	0.05	0.300	1.51/2.00
S 1175175	11.51/12.00	0.05	0.300	1.51/2.00
S 1225175	12.01/12.50	0.05	0.300	1.51/2.00
S 1275175	12.51/13.00	0.05	0.300	1.51/2.00
S 1325175	13.01/13.50	0.05	0.300	1.51/2.00
S 1375175	13.51/14.00	0.05	0.300	1.51/2.00
S 1425175	14.01/14.50	0.05	0.300	1.51/2.00
S 1475175	14.51/15.00	0.05	0.300	1.51/2.00
S 1525175	15.01/15.50	0.05	0.300	1.51/2.00
S 1575175	15.51/16.00	0.05	0.300	1.51/2.00
S 1625175	16.01/16.50	0.05	0.300	1.51/2.00
S 1675175	16.51/17.00	0.05	0.300	1.51/2.00

Expected Differences Among Analysts

It is recognized that in analyzing pig iron, different analysts working on a properly divided set of drillings from the same sample may not obtain the same results. In such cases, the following variations are commonly regarded as reasonable differences between results:

Element, per cent		Reasonable Difference
Manganese	0.80 or under	0.03
	Over 0.80 to 1.35 incl.	0.04
	Over 1.35 to 1.75 incl.	0.05
Phosphorus	0.040 or under	0.005
	Over 0.045 to 0.075 incl.	0.006
	Over 0.075 to 0.300 incl.	0.010
	Over 0.300 to 0.400 incl.	0.015
	Over 0.400 to 0.600 incl.	0.020
	Over 0.600 to 0.900 incl.	0.025
Sulphur	0.05 or under	0.005
Silicon	0.50 to 1.50 incl.	0.06
	Over 1.50 to 2.50 incl.	0.07
	Over 2.50 to 3.50 incl.	0.08
	Over 3.50 to 5.00 incl.	0.10
	Over 5.00	0.25

The general acceptance and use of standard pig iron compositions since their inception in 1941 have demonstrated those irons to have, in almost all cases, successfully replaced many irons of specialized compositions previously used.

The list of standard compositions will be altered from time to time to accommodate irons of proven merit and to provide for changes which may develop in the metallurgical and engineering requirements of industry.

Special Pig Irons

In addition to the standard grades of pig iron, certain special grades are available, usually at a premium price. In the aggregate, all of such special irons represent only a small percentage of the volume offered in the standard grades. Specifications to cover them are a matter of agreement between the seller and buyer. The same thinking should apply to pig irons purchased from foreign sources. Electric furnace pig irons of special composition, with high silicon contents or special alloy additions, are available.

Look! Here's an old Sterling Style "E" Flask — a veteran of 35 years' service.

No... the Whole Truth is NOT in the Holes!

It's that rugged reinforcing rib that adds such long life to Sterling Foundry Flasks. In spite of 35 years' service, the old flask shown here *could* be used if necessary. Even though holes are worn through the sides, those reinforcing ribs still hold the flask rigidly intact. You wouldn't expect to use a flask in that condition, but this exclusive Sterling feature emphasizes the superiority that has made Sterlings the No. 1 Foundry Flasks all over the world.

New Sterling Style "E" Flask ready to go into 35 years, or more, of tough foundry service.

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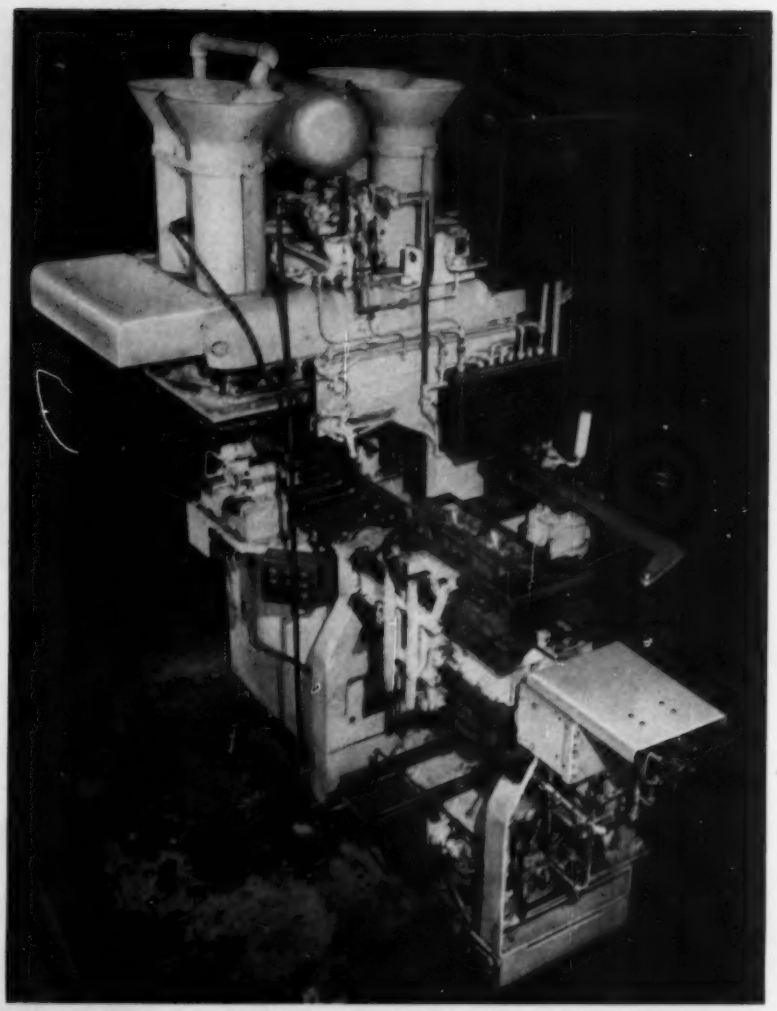
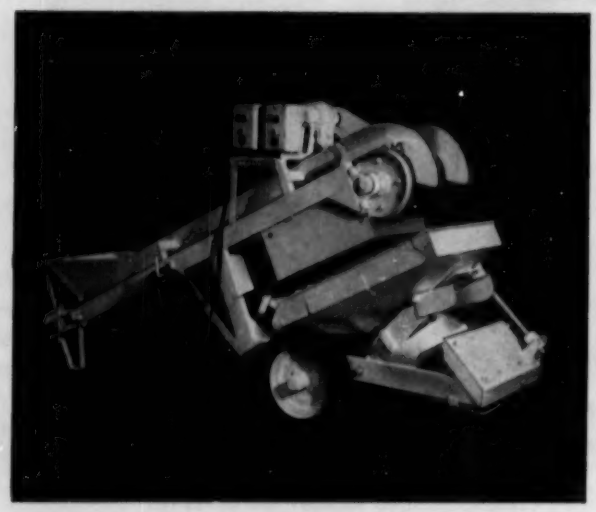
(Advertisement)

EQUIPMENT IN THE NEWS



A NEW HIGH SPEED TRUNNION-TYPE ROL-A-COR will speed rollover, draw, and other handling of production and semi-production cores. Used here in conjunction with a Champion CB-18 dual-head Blomatic Core Blower, the TR Rol-A-Cor handles two different boxes blown under two magazines on the blower. The total time cycle for clamping, blowing, unclamping, indexing, rollover, draw, and elevation of core to handling height is only 15 seconds. *For full data write to Beardsley & Piper, 2424 N. Cicero Ave., Chicago 39, Ill.*



MORE EFFECTIVE SAND CONDITIONING for the small foundry is now available at a cost well within even the most moderate budget. Reports on the new low priced Magnarator, which offers convenient hopper loading, magnetic separation, thorough screening and full aeration, indicate that up to 20 tons an hour can be handled by this portable machine. *Beardsley & Piper, 2424 N. Cicero Ave., Chicago 39, Ill., will provide full details.*

REALLY PORTABLE MULLING EQUIPMENT offers the foundry core room maximum flexibility at great savings. The Krause Foundry Co. uses their Mulbaro with four mulling barrows. The sand is loaded only once—when it is put into the barrows—and is mulled, delivered, and used from the same barrows. The mulling mechanism is utilized more fully *with no time lost for sand handling. Get all the facts from Beardsley & Piper, 2424 N. Cicero Ave., Chicago 39, Ill.*

For more facts, circle No. 67 on postage-free Reader Service card on p. 17 or 18

SMALL FOUNDRIES TOO can get all of the advantages of fully mulled and conditioned molding sand. This small, extremely compact Speedmullor-Preparator Unit is ideal for the small shop that needs complete sand preparation and resultant quality control. Six different low-cost units with capacities of from 7 to 70 tons per hour are available. *Send for all of the facts: Beardsley & Piper, 2424 N. Cicero Ave., Chicago 39, Ill.*

JOBBING FOUNDRIES HAVE A PROBLEM in handling a variety of short-run patterns. At Beloit Foundry much of this work is effectively handled on a J&J Jolt Rol-A-Draw. Pattern change time is minimized and machine handling of medium and medium-large flasks greatly reduces the load on cranes. The new J&J Rol-A-Draws feature *automatic air clamping of pattern boards. Beardsley & Piper, 2424 N. Cicero Ave., Chicago 39, Ill., will provide full data.*

80% OF BELOIT FOUNDRY'S DOUBLED TONNAGE is rammed by this Motive Speedslinger in a bay only 30 feet wide. Before its installation the foundry produced a little over 30 tons daily. After the Speedslinger was placed in operation this daily tonnage was boosted to 60. Not only that, but the foundry gets better results and can handle a wider range of large patterns. The slinger gives the foundry better control and uniformity too. *Write now for full information: Beardsley & Piper, 2424 N. Cicero Ave., Chicago 39, Ill.*

C. E. Hoyt, Longtime AFS Official, Dies

CHARLES EDGAR HOYT, 85, retired executive vice-president of the American Foundrymen's Society and dean of industrial exhibit managers, died Saturday, January 29, at MacNeal Memorial Hospital in Oak Park, Ill., following a heart attack earlier in his home.

Born June 5, 1869, in Wayland, Mich., he came from a family of foundrymen, his father and three uncles having learned the molding trade when a seven-year apprenticeship was required. During vacations he worked in the foundry and on finishing school he was associated for a time with his father in operating a foundry and machine shop.

Later he accepted a position with Michigan State College, Lansing, where he was in charge of pattern shop and foundry work for 3½ years. Resigning in 1899, he joined the engineering faculty of Lewis Institute (now part of Illinois Institute of Technology), Chicago, where he was the first instructor in foundry practice.

On locating in Chicago, "Charlie" or "Ed," as he eventually became known to hundreds of foundrymen, foundry equipment manufacturers and suppliers, and trade and technical organization officials, took an active part in foundry association work. In 1907 and again in 1908, as secretary-treasurer of the Chicago Foundry Foremen's Association (later the Chicago Foundrymen's Club and now the Chicago Chapter of AFS), he staged two-day conventions and exhibits at Lewis Institute which attracted national foundry industry attention.

C. E. Hoyt

As a result, he was elected secretary-treasurer of the Associated Foundry Foremen of America at the 1908 convention of AFS. In 1909 he was named secretary of the Foundry Supply Association, continuing as secretary and manager of exhibits of this association, and its successor, the Foundry & Machine Exhibition Co., until 1916 when the exhibits were taken over by AFS and he was made manager.

When AFS established a War Service office in Washington during World War I in response to a government request, he was placed in charge, only then resigning from the faculty at Lewis Institute where he had continued to serve during his earlier years of association activities.

In 1918 he was elected secretary-treasurer of AFS, in 1926 he was made executive secretary, treasurer, and manager of exhibits, and in 1937 his title became executive vice-president and manager of exhibits. At his own request, he was relieved of the executive vice-president's post in 1941 to devote his talents exclusively to organizing conventions and exhibits of AFS. In recognition of his outstanding service to the Society and the foundry industry, he was awarded the Joseph S. Seaman Gold Medal of AFS in 1941.

When the first meeting of record of the AFS Alumni Group was held in 1916, he was present, and in 1942 when a formal organization of "official family" members was proposed, he was named secretary, continuing in this post until his death although he officially retired in 1946.

In 1953, he married Jennie Reininga who survives him. They were associated in foundry organization activities from 1911 to 1946 when Mrs. Hoyt left the American Foundrymen's Society as assistant secretary-treasurer.

Calendar of Future Meetings and Exhibits

March

8-10 . . Instrument Society of America
Hotel William Penn, Pittsburgh. Fifth Annual "Instrumentation in the Iron and Steel Industry" Conference.

9-10 . . Foundry Educational Foundation
Hotel Cleveland, Cleveland. College-Industry Conference.

14-15 . . Steel Founders' Society of America
Drake Hotel, Chicago. Annual Meeting.

14-18 . . American Society of Tool Engineers
Shrine Auditorium, Los Angeles. First Western Industrial Exposition.

25-26 . . California Regional Foundry Conference
Huntington Hotel, Pasadena, Calif. Sponsored by AFS Northern California and Southern California Chapters.

28-Apr. 1 . . American Society for Metals
Pan-Pacific Auditorium, Los Angeles. Ninth Western Metal Congress and Western Metal Exposition.

April

7-8 . . Malleable Founders' Society
Edgewater Beach Hotel, Chicago. Market Development Conference.

15 . . Foundry Equipment Manufacturers Association
Shearton-Carlton Hotel, Washington, D. C. Spring Meeting.

18-19 . . Third National Air Pollution Symposium
Pasadena, Calif.

May

6 . . American Association of Spectrographers
Chicago. Sixth Annual Conference.

10-12 . . Metal Powder Association
Bellevue-Stratford Hotel, Philadelphia. Metal Powder Show and 11th Annual Meeting.

16-20 . . Sixth National Materials Handling Exposition
International Amphitheater, Chicago.

20-21 . . Non-Ferrous Founders' Society
Congress Hotel, Chicago. Twelfth Annual Meeting.

22-26 . . Air Pollution Control Association
Detroit. Forty-eighth Annual Meeting.

23-27 . . American Foundrymen's Society
Houston, Texas. 59th Annual Convention. Non-Exhibit.

31-June 3 . . Design Engineering Show
Convention Hall, Philadelphia.

June

8-10 . . American Welding Society
Municipal Auditorium, Kansas City. Third Annual Welding Show.

15-17 . . American Society of Training Directors
Ambassador Hotel, Los Angeles. Annual Convention.

16-18 . . Malleable Founders' Society
The Greenbrier, White Sulphur Springs, W. Va. Annual Meeting.

20-26 . . International Foundry Congress
London, England. Host: The Institute of British Foundrymen.

September

12-16 . . Instrument Society of America
Shrine Exposition Hall, Los Angeles. 10th Annual Conference and Exhibit.

October

19-21 . . Gray Iron Founders' Society
Hotel Schroeder, Milwaukee. Twenty-seventh Annual Meeting.

20-21 . . Missouri Valley Regional Conference
Missouri School of Mines, Rolla.

24-25 . . Steel Founders' Society of America
The Greenbrier, White Sulphur Springs, West Virginia. Fall Meeting.

November

14-17 . . Second International Automation Exposition
Navy Pier, Chicago.

EXPERIENCE from the very beginning of induction heating and melting is at your disposal when you call on Ajax.

It is leadership which began 38 years ago with the company's introduction of the first high frequency furnace for industrial use. Since then:

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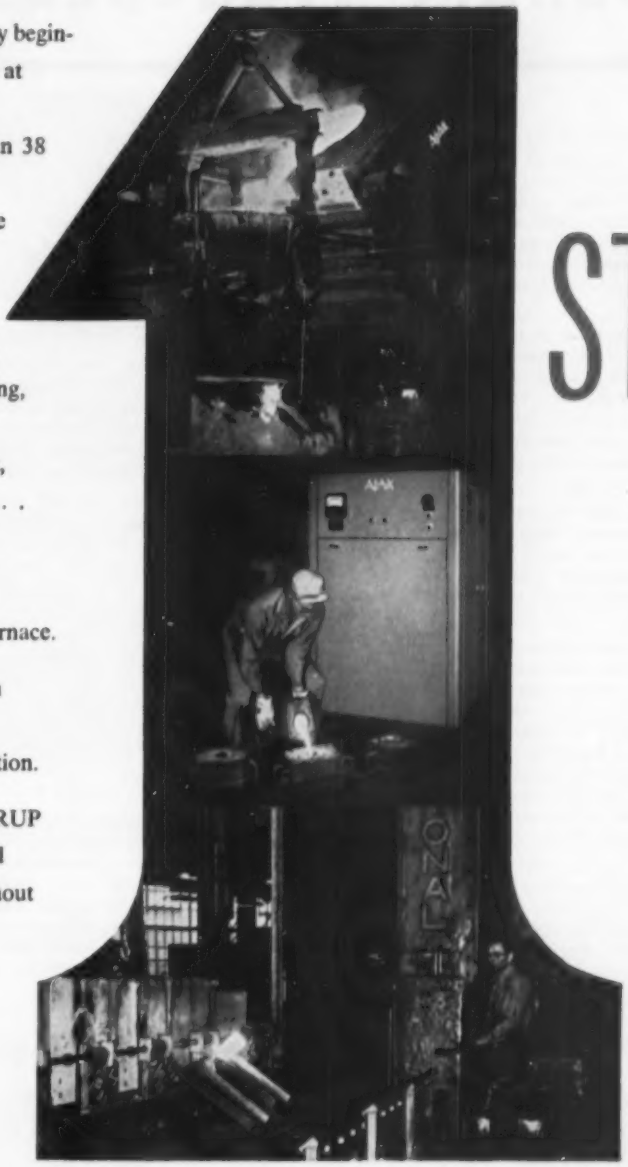
Ajax engineers can show you how this *experience*, which has maintained leadership over the years, can bring you important day-to-day benefits . . . in even your toughest heating or melting application. Telephone or write today.



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Foundry Tradenews

Managements of the **Gardner-Denver Co.**, Quincy, Ill., and of the **Keller Tool Co.**, Grand Haven, Mich., have announced that the stockholders of both companies have approved a consolidation. Keller Tool Co. now becomes the **Keller Tool Div., Gardner-Denver Co.** and will continue operations under the former Keller management.

Pittsburgh Coke & Chemical Co. has relighted its "A" Blast Furnace at Neville Island, Pa., due to increased demand for merchant pig iron. This furnace has been idle since April of last year. This increased demand stems mainly from foundries producing ingot molds, agricultural and automotive castings.

Ottawa Silica Co. has, through a subsidiary, **Standard Silica Co.**, acquired all of the physical assets of Standard Silica Corp. Standard Silica Co. will operate as a wholly owned subsidiary of Ottawa Silica Co.

The Chemicals Div. of **Kaiser Aluminum & Chemical Corp.** will build a $4,000,000 plant to produce basic refractories at Columbiana, Ohio. Besides substantially increasing their capacity to produce basic brick and ramming mixes, the new plant is expected to enable the Chemicals Div. to give better service to steel producers and other industries throughout the East and Middle West.

The entry of mass-produced American built shell molding equipment into the European market was announced by **Shalco Engineering Corp.**, of a new European sales and service company. They announced the formation of **Shallway International Corp.**, with rights to the sales and service of Shalco shell molding machines, Shalco shell core machines, and certain other items of Shalco shell molding equipment accessories.

Lehigh Foundries, Inc., Easton, Pa., has changed its corporate name to **Lehigh, Inc.** in order to better represent the diversification of products made by Lehigh, Inc., and its wholly owned subsidiaries.

Mercast Corporation, New York, has purchased the entire stock interest held by **National Bronze & Aluminum Foundry Co.**, Cleveland, in one of its licensees, the **Alloy Precision Castings Co.**, Cleveland. Mercast is an affiliate of the Atlas Corp.

Whirl-Air-Flow Corp., recently organized by John W. Cleveland, Raymond G. Pence, and George W. Anselman, to manufacture and sell pneumatic sand conveyors, is located at 4937 West Fullerton Ave., Chicago 39.

Grindle Corp. has recently expanded operations at their new location at 15405 Park Avenue, Harvey, Ill.

Industrial Crane & Hoist Corp., manufacturers of overhead cranes, jib cranes and monorail systems, has occupied new enlarged office and plant facilities at 1536 South Pauline St., Chicago 8.

Engineering, manufacturing, and sales of Cottrell electrical precipitators, until now divisional activities of **Research Corp.**, a non-profit foundation, have been taken over by a new wholly-owned subsidiary, **Research-Cottrell, Inc.**, it was announced by Joseph W. Barker, chairman of the parent organization. Dr. Barker, who is also president of Research Corp., has been elected chairman of Research-Cottrell, Inc. Howard Coonley, vice-president of Research Corp., is vice-chairman of the subsidiary company.

Saginaw Division, **Eaton Manufacturing Co.**, Cleveland, began revamping operations not long ago. The building will be approximately 15,000 square feet and will house many new pieces of equipment. A 4,500 lb load electro-furnace will replace one of the present 900 lb furnaces. New lunch rooms and showers will be installed, and a bridge-like mono rail will be erected over the furnaces for easier handling of charge material and molten metal. The floor plan will be completely reorganized for better handling of sand and castings.

The National Safety Council recently presented the **Garrett Corporation's AiResearch Manufacturing Div.,** Los Angeles, with their Award of Honor, highest recognition obtainable for an outstanding safety record in industry. To win the top award, AiResearch employees worked 3,300,140 man-hours without a lost-time injury during the four-month period from April 14 to August 16, 1954, well over the 3,000,000 man-hours needed to qualify. It was the second time this year that AiResearch topped this mark.

South Chester Tube Co., Chester, Pa., announced the purchase of **Dodge Steel Co.**, Tacony, Philadelphia, Pa. The newly acquired firm will be operated as a separate and wholly owned subsidiary. Its products range from intricate machinery and equipment parts to specially designed pressure units for valves, pumps, and turbines.

Ohio Tramrail Systems will have thorough coverage to service material handling accounts in the Central States area as result of four recent distributor appointments, it was announced by **Yorker Corp.**, Cleveland. **American Equipment Co., Inc.**, Milwaukee, will represent the overhead handling system in the Wisconsin area. **E. I. Knorring & Co.**, Chicago, will service Chicago and surrounding cities. **Fred Thresher Co.**, Jackson, Miss., will handle Mississippi's industrial areas, and **Urban M. Lodge**, Denver, will cover the Rocky Mountain area.

Battelle Memorial Institute, Columbus, Ohio, has published a new bulletin, *"Battelle Research . . . How It Can Help You Solve Technical Problems."*

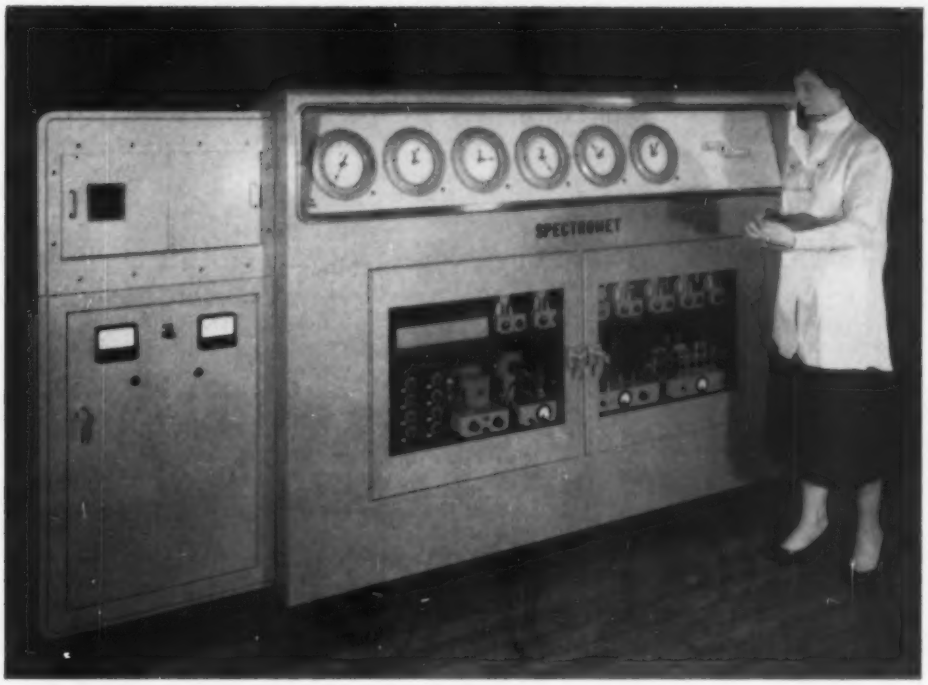
Air Reduction Co., Inc., New York, N. Y., has recently published *"Facts About Air Reduction"* which describes generally the products and services of the various divisions of the company.

Callander Foundry & Manufacturing Co., Ltd., has changed its name to **Rockwell Manufacturing Co. of Canada Ltd.**, 100 Crimea St., P. O. Box 420, Guelph, Ontario, Canada.

Dewey Pattern Co. has moved to a newer and larger plant at 2512 Albion St. The new location was purchased to provide added space and modern facilities for expanded operations. The firm can now handle pattern jobs of any size and will be able to do extensive experimental and tryout work.

Pangborn Quarter Century Club Meets

Pangborn's Fourth Annual Banquet of the Quarter Century Club was held at the Alexander Hotel, Hagerstown, Md. Eighteen new members were welcomed to the club. New members include: Oscar H. Butts, Robert V. Delaney, Robert E. Donnelly, Adnah L. Gruber, Charles M. Hartman, George G. Hoffman, John R. Hyssong, Wallace F. Jones, John E. Keplinger, Alvey L. Kinsey, Walter S. Miller, George J. Reichert, Ralph D. Ridgley, Bruce T. Rinehart, Arthur C. Shearer, Sr., Richard H. Smith, Ralph M. Trent and Leonard W. Unger.



Baird Associates Presents...

Quality Control On The Production Floor

With the new Baird Spectromet*, spectrochemical analysis is possible directly on the floor of the foundry and in the meltshop. Thirty to forty seconds after the sample is burned, the concentrations of six elements in the sample are read from indicators located on the face of Spectromet*. The indicator readings can be easily and rapidly translated into accurate corrections in the melt and give constant control of the contents of the melt.

The speed of the instrument's operation permits as many as 180 determinations per hour providing practical analytical data at low cost per sample.

Sealed optical and electronic compartments provide a built-in laboratory environment. Maintenance is reduced to a minimum.

For more information why Spectromet* can help serve your analytical needs, write for free technical Bulletin #42.

Visit Booth 25, 26, 27
Pittsburgh Analytical Exposition
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Hold California Regional March 25-26

The California Regional Foundry Conference, sponsored by the Northern California and Southern California AFS Chapters, will be held at the Huntington Hotel, Pasadena, Cal., March 25 and 26. The conference will treat ferrous and nonferrous interests simultaneously with two papers each, on iron, steel, bronze, and aluminum foundry practices. In addition there will be two sessions of general interest to all foundrymen. Also scheduled is a program for the ladies.

Conference general chairman is William C. Baud, Mechanical Foundries Div., Food Machinery Co., Los Angeles. Advance registration can be made with Mr. Baud by writing to Box 58361, Vernon Branch, Los Angeles 58. Hotel accommodations can be arranged at the Huntington by writing to Bruce Farrow, Housing Chairman, Barker Foundry Supply Co., 2428 East 52nd St., Los Angeles 58.

Technical Chairman Otto H. Rosentreter, Otto H. Rosentreter Co., South Gate, Cal., has set up the following program:

FRIDAY, MARCH 25

9:00 am . . REGISTRATION.

11:30 am . . LUNCHEON. Speakers: Charles R. Gregg, Gregg Iron Foundry, El Monte, Cal. and Herbert F. Scobie, Editor, AMERICAN FOUNDRYMAN.

10:00 am . . SECTIONAL MEETIONS.

Iron . . *"Improved Methods in Foundry Practice,"* Harry H. Kessler, Sorbo-Mat Process Engineers, St. Louis.

Bronze . . *"Major Factors Influencing Quality of Aluminum and Copper Base Alloys,"* Donald L. LaVelle, Federated Metals Div., American Smelting & Refining Co., South Plainfield, N. J.

3:00 pm . . SECTIONAL MEETINGS.

Steel . . *"Scientific Approach to Feeding Castings,"* Malcolm MacGregor, General Metals Corp., Oakland, Cal.

Aluminum . . *"Production of Aluminum Alloy Specification Castings,"* Roy E. Paine, Aluminum Co., of America, Los Angeles.

6:00 pm . . FELLOWSHIP HOUR.

7:00 pm . . DINNER.

8:30 pm . . *"New Developments in Foundry Welding,"* Jonathan Marden, Eutectic Welding Alloys Corp., New York.

SATURDAY, MARCH 26

10:00 am . . SECTIONAL MEETINGS.

Steel . . *"Making Steel Castings with Sand Reclaimed by the Dry Method,"* William D. Emmett, Los Angeles Steel Casting Co., Los Angeles.

Aluminum . . *"Popular Aluminum Casting Alloys,"* John J. Stobie, Jr., Apex Smelting Co., Long Beach, Cal.

12:00 noon . . LUNCHEON.

1:30 pm . . SECTIONAL MEETINGS.

Iron . . *"Basic Principles of Sand Control,"* Harold E. Henderson, H. C. Macauley Foundry Co., Berkley, Cal.

Bronze . . *"Effective Essentials Required to Make Good Castings,"* W. M. Ball, Jr., R. Lavin & Sons, Inc., Cincinnati.

3:00 . . *"Gating and Risering of Castings as Affected by Exothermic Materials,"* Michael Bock, II, Exomet Inc., Conneaut, Ohio.

5:00 . . FELLOWSHIP HOUR.

Safety Certificate of Award Presented

M. D. Yatsko, third from left, president of Terre Haute Malleable & Mfg. Corp., Terre Haute, Ind., accepting congratulations and certificate of award from the officials of the compensation insurance carrier upon the excellent safety record the firm established during the past 21 months. They have operated well over 1,500,000 hours without having suffered one lost time injury. Also shown are officials, foremen, safety and union committees.

News of Technical Committees

Recent Committee Meetings

Cast Metals Handbook Revision Committee, Detroit, Jan. 12

Basic Concepts Committee, Sand Div., Chicago, Jan. 21

Heat Transfer Committee, Washington, D. C., Jan. 24

Committee 8-J, Sand Div., Ann Arbor and Detroit, Jan. 24-28

Dust Control & Ventilation Committee, AFS Technical Center, Des Plaines, Ill., Jan. 25

Program & Papers Committee, Gray Iron Div., Chicago, Jan. 28

Flowability Committee, Sand Div., Milwaukee, Feb. 9

Joint Committee on Foundry Vocational Training, Educational Div., Cleveland, Feb. 14

Dust Control & Ventilation Committee, Louisville, Ky., Mar. 8

Committee 4-Q, Educational Div., AFS Technical Center, Des Plaines, Ill., April 5

Meeting Reports

Dust Control & Ventilation. AFS Headquarters, Des Plaines, Ill., was the location of the January 25 meeting. The committee, under Chairman John G. Liskow, American Air Filter Co., Louisville, finalized their program for the Annual AFS Convention at Houston May 23-27.

The use of "wet" water for dust suppression in certain foundry operations was discussed and an author was selected to prepare material for inclusion in the forthcoming ENGINEERING MANUAL FOR CONTROL OF IN-PLANT ENVIRONMENT OF FOUNDRIES.

Section 1 of this manual, *Foundry Hygiene Problems and Introduction to Principles of Foundry Ventilation* is in the hands of the Steering Committee.

Section 2, *Exhaust Hoods & System Design,* and Section 3, *Practical Design of Sand Handling Ventilation Systems,* are at the publisher and are now available.

The committee reviewed Section 5, *General Principles of Ventilation for Melting and Pouring Operations,* and Section 11, *Maintenance and Testing,* and forwarded them to the Steering Committee.

The committee recommended that information on hood designs for shell molding operations be incorporated in Section 4, *Sand Preparation, Core Making, and Molding.*

Gray Iron Program & Papers. Chairman C. K. Donoho, American Cast Iron Pipe Co., Birmingham, Ala., presided at the January 28 meeting at Hotel Sherman, Chicago. The committee approved and scheduled papers for the Gray Iron Sessions of the Houston Convention and made arrangements for their round table luncheon on Wednesday, May 25.

Can You Make Figured Plaque with Smooth Pattern?

The gray iron plaque shown in the illustration was made from a perfectly smooth (except for the letters) pattern—an 8 x 12-in. piece of ½-in. plywood. It was cast in the drag and represents a unique example of a composite green mold made of controlled mold materials. The exaggerated alligator-skin effect is due entirely to the mold materials used.

How did the casting get that way? Before saying "veining" keep in mind that while the ridges of the irregular design are higher than the smooth central portion, the depressions are lower than the smooth area.

What is a casting with a surface like this good for? Ornamental purposes . . . plaques . . . gangways and stair treads (depth and size of depressions can be controlled)?

For the three best explanations of how this casting was made, what mold materials were used, and what phenomenon causes the unusual surface, plus suggestions for applications, AMERICAN FOUNDRYMAN will send a copy of the historical classic DEVELOPMENT OF THE METAL CASTINGS INDUSTRY. Explanations will be published in Letters to the Editor. Send explanation to Editor, AMERICAN FOUNDRYMAN, Golf and Wolf Roads, Des Plaines, Ill., to arrive not later than April 1.

M. F. S. Presents Accident Prevention Awards

H. H. Lloyd, Albion Malleable Iron Co., Albion, Mich., second from left, presenting Malleable Founder's Society Safety Letter awards. Others, left to right, Nathan Saffren, second prize winner; J. L. Turpin, first prize winner, and Lawrence Kaelin, third prize winner.

Winners of the Second Safety Letter competition were announced at the Malleable Founders' Society Semi-Annual Meeting, held January 21, at Hotel Cleveland, Cleveland. President Charles E. Brust, Eastern Malleable Iron Co., Naugatuck, Conn., presided and after reviewing the Society's current program for the first half of his term, introduced several committee chairmen who reviewed the details of their activities.

Winner of the first prize, $100, in the Safety Letter competition was James L. Turpin, National Malleable & Steel Castings Co., Indianapolis; second prize of $75 was awarded to Nathan Saffren, Acme Steel & Malleable Iron Works, Buffalo, N. Y.; third prize of $50 to Lawrence Kaelin, National Malleable & Steel Castings Co., Indianapolis, and fourth prize of $25 to Wm. B. Sobers, Chain Belt Co., Milwaukee. Letters will be published in the April issue of AMERICAN FOUNDRYMAN.

Subject of the letters was "Accident Prevention." Of interest in connection with the society's safety program is that at least four plants went through the year 1954 without a lost time injury, whereas only one plant accomplished that in 1953.

Features of the semi-annual meeting included a specially arranged tour of the society's laboratory, a display of "human relations" material used by member companies, and a round table discussion of those attending on the subject "Are We Prepared for Competition in 1955?"

Standard Samples Circular Published

Standard Samples and Reference Standards (Circular 552), contains a descriptive listing of the various Standard Samples issued by the National Bureau of Standards. A schedule of weights and fees, as well as direction for ordering is included. Summarized tables of analyses are presented, to indicate the type of standards of composition presently available. Current status of the various standards will be indicated by a mimeographed insert.

Copies of the circular, which contains 23 pages and costs 25 cents, may be obtained by writing the Government Printing Office, Washington 25, D. C.

TOLEDO . . Chairman Eggenschwiler extolling some of the AFS publications at the January meeting. Seated, left to right: W. W. Camp, R. Olson, guest speaker, and V. E. Zang.

Chapter News

Never Too Old to Join

Maybe there will never be an AFS chapter on Formosa, but at least the Society has a foothold there.

Dr. H. R. Hanley, over 80 years old, has just joined AFS, and his membership card has been sent to Tianan, Formosa, where he has organized a department of non-ferrous metallurgy in the University of Tiawan.

Dr. H. R. Hanley

Professor emeritus of metallurgical engineering at Missouri School of Mines, Rolla, Dr. Hanley has been in Formosa since January 1954.

Although officially retired, he has continued to do some teaching and has carried on an extensive research program in various fields of metallurgy since his retirement.

Northwestern Pennsylvania

The January meeting was held at the Moose Club, Erie, Pa. Prior to the meeting the chapter directors held a noonday meeting with AFS General Manager Wm. W. Maloney, National Director Thomas Kaveny, Jr., and Administrative Assistant D. J. Hayes, present.

The general meeting, which was attended by foundrymen from nearby Conneaut, Ohio and Pittsburgh, Pa., was turned over to George L. Hoobler, International Nickel Co., Inc., who spoke on "Ductile Iron."—*Roy A. Loder.*

Saginaw Valley

At the January meeting held in Frankenmuth, Mich., Chairman W. W. Holden, Eaton Mfg. Co., announced that the chapter was within eight members of reaching the membership quota for the current year. At this National Officers' Night meeting, Regional Vice-President E. C. Hoenicke and National Director Claude B. Schneible were introduced and pointed out some of the values of AFS membership from management's standpoint. C. E. Nelson, Dow Chemical Co., was introduced as national director nominee.

Dr. Richard A. Flinn, Professor of metallurgical and production engineering, University of Michigan, discussed "Research in Tomorrow's Foundry Problems," which was a progress report on metallurgical research being carried out at the University. He defined three hurdles which must be overcome in making the castings of the future, melting, solidification and molding. A possible fourth hurdle would be the correlation of microstructure to properties. The microbend test was presented as a tool to study the relation of structure to properties.

Dr. Flinn also touched briefly on titanium castings, high temperature alloys, vacuum melting, vacuum fusion analysis, tracer techniques with nodular iron to determine the role of various elements in changing the graphite structure, shrinkage and feeding properties of various alloys, and the comparison of surface finish and reproducibility of dimensions of shell mold castings and castings made by other molding methods.—*N. Sheptak.*

Western Michigan

The January meeting, constituting a round table discussion, was held at the Cottage Inn, Muskegon, Mich. Members were divided into two groups. The ferrous castings group, directed by A. W. Demmler, Campbell, Wyant & Cannon Foundry Co., discussed foundry problems pertinent to coke, cupola exhaust content and cleaning, boring injection and briquets, basic lining, and titanium ore.

A. E. Jacobson, Jr., Grand Haven Brass Foundry, directed the non-ferrous castings group, which discussed problems of pattern partings, coatings, and core making including the CO^2 process. Prior to the technical meeting a colored movie of last summers picnic was shown.

The chapter's annual Christmas Party was held December 10 at the Muskegon Country Club, Muskegon, Mich. The affair, a dinner dance for members and their ladies, was attended by 100 couples. Gifts were presented to all the ladies attending. —*W. W. Hicks.*

Quad City

The January meeting was held at Hotel Fort Armstrong, Rock Island, Ill., with W. Ellison presiding. Guest speaker, W. R. Jennings, John Deere Waterloo Tractor Works, was introduced by D. E. Gilchrist, Deere & Co., technical chairman. Mr. Jennings spoke on "The Foundryman's Responsibility in Automation." He emphasized that automation was not conducive to every shop much as complete mechanization was not undertaken by every shop in the early 1940's. He interpreted automation as, "the reduction of human labor to reduce human error and ultimately produce a more uniform product." During the discussion it was pointed out that mechanization is not in itself automation. A jolt-squeeze molding machine constitutes mechanization but automatic machines or reduction of human handling is automation.—*G. F. Thomas.*

Michiana

The January meeting, attended by 100 members and guests at the Oliver Hotel, South Bend, Ind., was a split meeting.

D. La Velle, American Smelting & Refining Co., spoke on Better Aluminum Castings at the non-ferrous section. He conducted a round table type of discussion covering defects in aluminum castings, their causes and their remedies.

S. F. Carter, Jr., American Cast Iron Pipe Co., Birmingham, Ala., spoke on Some Factors in Cupola Control at the ferrous section. He demonstrated by means of graphs and tables of analysis

the effect of different variables on cupola operation, and control of the three main reactions: carbon absorption, sulphur pickup and oxidation loss.—*F. J. Crowley.*

Central Ohio

The January meeting was held at Columbus Ohio, and was a joint meeting between local chapters of AFS and A.S.M. Over 100 members and guests attended. Frank H. Beck, Ohio State University, presided.

S. C. Massari, Hansell-Elcock Co., Chicago, was guest speaker and his subject was "Recent Developments in the Casting Field." Mr. Massari opened his talk with the enumeration of foundry operating fundamentals. He stressed the importance on consultation between the foundryman and designer to produce better castings at a lower cost. The way better castings can be made through consultation are: simplifying molding through nonfunctional changes in design, balance of pattern cost and molding cost determined by expected quantity of production, and selection of proper metal specifications in regard to the casting section size.

Recent developments discussed were: high pressure diaphragm molding, shell molding, D process, gating systems, nodular iron, basic cupola and water cooled cupola tuyeres.—*Eldon Boner.*

Ohio State

The January meeting of the Ohio State University student chapter was held in the Industrial Engineering Building on the Ohio State University campus. Guests at the meeting were R. M. Meyer, Ohio Steel Foundry Co., Springfield, Ohio; Dallas M. Marsh, Cooper-Bessemer Corp., Mt. Vernon, Ohio, and Paul E. Eubanks, Ohio Steel Foundry Co.

Speaker for the evening was Dwight C. Swepston, vice-president of the local Junior Chamber of Commerce, who talked on the functions and objectives of the Jay Cees.—*W. F. Clutton.*

Brooklyn Polytechnic

On December 27 the student chapter of Brooklyn Polytechnic Institute visited the Mahwah, New Jersey Foundry of American Brake Shoe Co. R. A. Martinson, Morris Ruddick, Ed. Caracciola, and Emil Rogner conducted the group on a complete tour of the plant. They visited the production, jobbing and experimental foundries, and the new foundry and metallurgical laboratories where the company is doing some extensive research in the fields of metal casting and powder metallurgy. The visit was concluded with a dinner at the company's Otis Cutler Club.—*R. A. Mendelow.*

Toledo

Approximately 100 members and guests attended the January meeting of the Toledo Chapter at the Toledo Yacht Club, Toledo, Ohio. The meeting was designated as Top Management Night.

Following the supper and introductions, chapter chairman C. E. Eggenschwiler gave a summary of the work and aims of AFS, pointing out to top management the values received. V. E. Zang, Unitcast

ROBERT G. KING, OBERDORFER FOUNDRIES, INC.

CENTRAL NEW YORK . . Attending the Annual Christmas Party held at the Onondaga Hotel, Syracuse, N. Y., from left to right: D. Carter, New York Air Brake Co., Watertown, N. Y.; L. Iannetoni, Oberdorfer Foundries, Inc., Syracuse, N. Y.; W. C. Stevenson, Rensselaer Valve Co., Troy, N. Y.; Mistress of Ceremonies; D. C. Brainard, Dayton Oil Co., Syracuse, N. Y., L. D. Wright, U. S. Radiator Corp., Geneva, N. Y.; J. M. Clifford, Atlas Steel Castings Co., Buffalo, N. Y., and L. R. Barnhart, Thomas Foundry, Inc., Syracuse, N. Y.

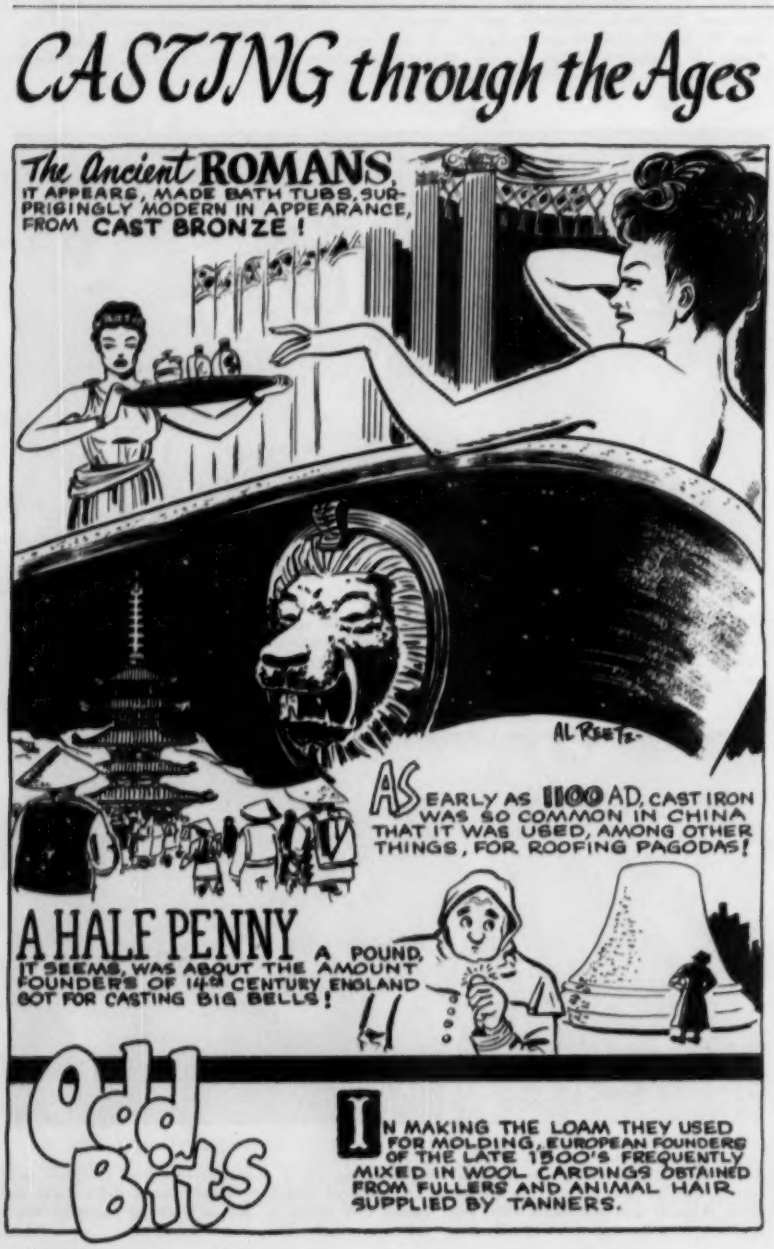
CENTRAL ILLINOIS . . Past chairmen of the chapter which were honored at the January meeting, front row, left to right: L. E. Roby, F. W. Shipley, A. Martins, and Z. Madacey. Back row, left to right: G. H. Rockwell, R. E. Dickinson and C. W. Bucklar, Jr. C. Russell and H. Felton were absent.

NOBLE YORK, INTERNATIONAL HARVESTER CO.

CENTRAL INDIANA . . At the January meeting standing is F. E. Kurtz, Electric Steel Castings Co.; seated, left to right, Prof. R. Schnidewind, University of Michigan, guest speaker who spoke on Gray, Nodular and Malleable Iron; Wm. Zunich and James A. Barrett, both of National Malleable & Steel Castings Co. Indianapolis.

HAROLD WHEELER, SUPERIOR FOUNDRY, INC.

NORTHEASTERN OHIO. . Group view of members and guests at the Christmas Party, held December 9 at Hotel Carter, Cleveland. Dinner and floor show were highlights of the program.


CASTING through the Ages
The Ancient ROMANS, IT APPEARS, MADE BATH TUBS, SURPRIGINGLY MODERN IN APPEARANCE, FROM CAST BRONZE!
AL ROETZ
AS EARLY AS 1100 AD, CAST IRON WAS SO COMMON IN CHINA THAT IT WAS USED, AMONG OTHER THINGS, FOR ROOFING PAGODAS!
A HALF PENNY A POUND, IT SEEMS, WAS ABOUT THE AMOUNT FOUNDERS OF 14th CENTURY ENGLAND GOT FOR CASTING BIG BELLS!
Odd Bits
IN MAKING THE LOAM THEY USED FOR MOLDING, EUROPEAN FOUNDERS OF THE LATE 1500'S FREQUENTLY MIXED IN WOOL CARDINGS OBTAINED FROM FULLERS AND ANIMAL HAIR SUPPLIED BY TANNERS.

Corp., former chapter chairman and national director, spoke briefly of the history and early activities of the Toledo Chapter.

Technical chairman Wayne W. Camp introduced guest speaker Ray Olson, Production Pattern and Foundry Co. and Shell Process, Inc., both of Chicopee, Mass. Mr. Olson spoke of the values and applications of shell molding techniques used by his company.—*G. W. Davison.*

Central Illinois

The January meeting was Past Chairman's Night. M. J. Gregory, the only member of the chapter who holds an honorary life membership in the American Foundrymen's Society, served as technical chairman and introduced the speaker, Wm. G. Gude, managing editor of *Foundry* magazine, who spoke on "What's Ahead in the Foundry Industry". After Mr. Gude's talk, Mr. Gregory presented the past chairmen with bronze plaques designating their service to the chapter.

The nine past chairmen honored were: Ed Roby, Frank Shipley, Al Martins, Zig Madacey, George Rockwell, Robert Dickinson, Charles Buckles, Jr., Clayton Russell and Henry Felton. Messers Russell and Felton were unable to attend the meeting.

Herbert F. Scobie, editor of AMERICAN FOUNDRYMAN magazine and National Director C. V. Nass, Pettibone Mulliken Corp., came to Peoria to honor the past chairmen and participate in the program. They also attended a board meeting which was held prior to the evening program.—*C. Turner.*

Eastern New York

More than 75 members and guests attended the January meeting at Panetta's Restaurant, Menands, N. Y., to hear Hans J. Heine, AFS Technical Director, speak on *"AFS Research—Your Foundry's Silent Partner."*

Mr. Heine stated that to attract more business, the foundry industry must make more use of new developments and technological advances and must employ more engineers and metallurgists. Among the new tools ignored by foundrymen is stress analysis by means of brittle lacquer coatings. He stated that this technique can yield tremendous results at small cost. It enables the foundryman to design adequately and economically; helps him to locate areas of maximum stress concentration, so that he can add or remove metal accordingly.

In the future, he said, the foundry industry should make wider use of vacuum melting to improve properties; high carbon coke for cupolas, and carbon dioxide baking for cores and molds.

—*L. J. DiNuzzo*

Central New York

Ninety-two members attended the January meeting in the Roof Garden, Onondaga Hotel, Syracuse, N. Y., with Joseph A. Gibson, Sweets Foundry, Inc., Johnson City, N. Y., presiding.

John R. Lewis, Titanium Alloy Mfg.

Div., National Lead Co., was guest speaker and his subject was *"Zircon and its Use in the Foundry."* He discused recommended mixtures for green and dry sand cores as well as green sand molding. Also recommended mixing and baking times. He cautioned that moisture should be kept to minimum, should use dry core boxes and tools. The salient features stressed were, that it minimizes fusion with molten metal, resists metal wetting, prevents metal penetration and results in smoother casting surfaces.

Over 250 members and friends attended the Annual Christmas Party held in the Ballroom of the Onondaga Hotel, on December 11.—*Bruce R. Artz.*

Timberline

The January meeting, attended by 34 members and guests, was held at the Oxford Hotel Denver, Colo., with chairman E. Byron McPherson, Jr., presiding. Vice-chairman W. R. Manske, American Manganese Steel Div., American Brake Shoe Co., Denver, Colo., introduced Curtis C. Drake, Griffin Wheel Co., Denver, who spoke on *"Precision Casting"* and illustrated his talk with slides.

Mr. Drake's talk covered investment practice, C process, G process and high pressure casting. In particular, he covered their new process used locally, whereby cast steel wheels are poured by forcing liquid metal of .70 to .80 carbon into graphite molds. Molds are set on a track above the ladle of molten metal and each mold in turn is moved up over the ladle, sealed and the metal is forced up from the bottom into the mold under a pressure of 30 lb.—*A. D. Neal.*

Philadelphia

Main speaker at the January meeting was J. A. Gitzen, Delta Oil Products Co., Milwaukee, and his subject was *"History of Sand Additives."* There were 121 members and guests present.

Mr. Gitzen spoke of the various ways of ruining the properties which additives give sand. Improper mixing of the sand in regard to proper mixing sequences, and then the drying of the cores. Many cores are well made with expensive ingredients, and too many times are ruined in the drying ovens through temperature controls, too short time in the oven, and burning. To properly bake a core and insure best results, the time cycle should be 12 hr per in. of core thickness, with core mix at 2½ per cent oil. A core with 1½ per cent oil should be baked approximately 7 hr per in. to insure a dry core, he said.

Many foundries use cores not dried completely because of the time involved, and thereby cause defects which can be traced to wet cores. An aid to decrease drying time is the use of ammonium nitrate in the core mix. This gives off oxygen and speeds up the drying time by helping the oil to oxidize more quickly.—*Charles R. Sweeny.*

Texas

Twenty-eight members and guests were present at the January meeting of the San Antonio Section of the Texas Chapter. A safety film, *"If You Bring Your*

ST. LOUIS . . Speakers table at the January meeting, from left to right: AFS National Director C. V. Nass, Pettibone Mulliken Corp. and guest speaker; F. J. Boeneker, Bronze Alloys and chapter chairman; G. L. Mitsch, A. C. F. Industries and chapter vice-chairman, and AFS National Director J. T. Westwood, Blue Valley Foundry.

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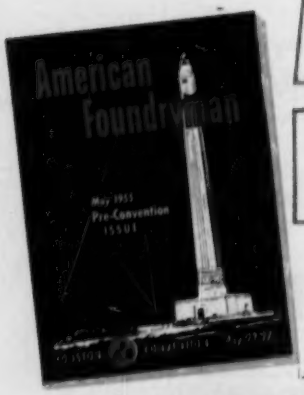

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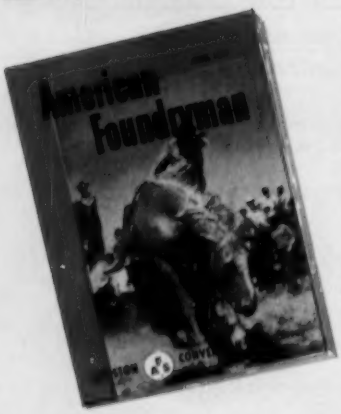

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Family to Work," was shown. The regular casting problem clinic was held and two problems were presented and discussed. Refreshments following adjournment were sponsored by SAMSCO.—*George H. Hartwell.*

Southern California

The January meeting was held at the Rodger Young Auditorium and 125 members and guests were in attendance. Prior to introduction of the speaker William Baude, Mechanical Foundries Div., Food Machinery Corp. and chapter vice-president, gave a résumé of what can be expected at the California Regional Foundry Conference which will be held March 25 and 26 at the Huntington Hotel, Pasadena, Cal., and is being given in conjunction with the Western Metals Congress which begins March 28.

Donald J. Reese, Development and Research Div., International Nickel Co., was the speaker for the evening and his subject was *"The Melting Department of An Iron Foundry"*. He referred to optimistic business predictions for 1955 as quoted from various sources. Prediction was made that ductile iron would experience a very large growth in the next few years.—*W. G. Stenberg.*

Central Michigan

Youth Encouragement Night was held by the chapter January 19 at the Hart Hotel, Battle Creek, Mich. Over 100 members and young men heard E. J. Walsh, executive director of Foundry Educational Foundation outline the challenges and opportunities that are to be found in the foundry industry of today. F. J. Walls, International Nickel Co., introduced the speaker. Collins Carter, Albion Malleable Iron Co., was called upon for a few encouraging remarks to the young people attending. Football pictures of Michigan State-Notre Dame game were shown later in the evening.—*L. Heisler.*

Birmingham District

Sixty-five members and guests attended the January meeting at the Tutwiler Hotel, Birmingham, Ala. to hear Jim Lowe, Mid Continent Steel Casting Corp., Shreveport, La., discuss *"Castings versus Weldments"*. Edwin E. Pollar, chapter chairman, presided and Concie Caldwell, Caldwell Foundry & Machine Co., introduced the speaker.

Mr. Lowe's remarks were preceded by the showing of a film *"Steel Casting Design"* by the Steel Founders' Society of America. Of particular interest were a series of slides illustrating good casting design as against poor casting design. Ways and means of employing welding to fabricate small castings into complex structures were discussed in some detail. —*J. A. Wickett.*

St. Louis

The January meeting was highlighted by the presence of two national directors of AFS, J. T. Westwood, Blue Valley Foundry and C. V. Nass, Pettibone Mulliken Corp., who was also the guest speaker. Mr. Nass who was introduced by technical chairman A. C. Guthrie,

American Steel Foundries, spoke on *"Mechanization in Coremaking"*.

With the ever increasing labor costs that the industry is experiencing, it becomes more important that labor saving devices be used, Mr. Nass said. This applies not only to the direct production equipment, but also to the related materials handling equipment. All mechanizing must be the result of careful overall planning and the degree of flexibility required by the foundry must be maintained, lest the foundry find itself unable to adapt itself to its production requirements. Proper use of mechanized equipment will always result in better castings at lower costs. Entertainment chairman, John O'Meara, Banner Iron Works, announced plans for the second annual Spring Dinner Dance to be held April 16 at Norwood Country Club.—*J. R. Bodine, Jr.*

Western New York

William P. Bender, General Electric Co., Erie, Pa., was guest speaker at the January meeting held at the Sheraton Hotel, Buffalo, N. Y.

The customer, or casting buyer, is always seeking higher quality castings at lower prices, and competitive casting pricing requires better manufacturing methods, Mr. Bender said. One of these methods is planned engineering of castings and pattern designing. This development would vary considerably, depending upon foundry personnel, shop facilities, mechanical equipment, size and kind of castings, as well as volume of production.

The two main tools are the blue-print drawing and the working pattern equipment. While the drawing is often taken too lightly it is the basis of detailed and constructive information in the manufacturing industry, and mutual understanding and agreement on changes in early stage creates good will, savings in time and cost to customer. Good shop organization planning is required to produce quality castings as the accepted price and schedule, to maintain good customer relations.—*Roger E. Walsh.*

Tri-State

The January meeting was designated Apprentice Night and was held at the Alvin Hotel, Tulsa, Okla. *"Molding Sands"* was the subject of J. S. Schumacher, Hill & Griffith Co., Cincinnati, Ohio. He discussed synthetic sands, high pressure molding, scrap control and low cost mechanization. Different sands were considered and compared as to (1) sensitiveness to ramming (2) range of moisture content (3) range of casting weight (4) low cost and (5) variety of metals in some sand.

Mr. Schumacher's talk was built around the four screen sand and its place in precision molding. Special emphasis was placed on high mold-wall stability and screen analysis.—*A. M. Fisher.*

Eastern Canada

Approximately 75 members and guests attended the January meeting, designated Top Management Night, at the Sheraton Mount Royal Hotel. Guest speakers were AFS National Director H. G. Robertson

CENTRAL ILLINOIS . . Admiring plaque presented to past chairmen at the January meeting, left to right: AFS National Director, C. V. Nass, Pettibone Mulliken Corp.; M. J. Gregory, retired, technical chairman for the evening; W. G. Gude, Foundry, and guest speaker; and H. F. Scobie, editor, AMERICAN FOUNDRYMAN.

KEN SHECKLER, CALMO ENGINEERING CO.

SOUTHERN CALIFORNIA . . Talking things over at the speakers table during the January meeting, from left to right: J. W. Mitchell, Utility Steel Foundry and chapter secretary; F. C. Warga, AiResearch Mfg. Co. and chapter treasurer; Charles Gregg, Gregg Iron Foundry, and chapter president; AFS National Director B. G. Emmett, Steel Castings Co.; A. C. Gutch, Dayton Foundry and chapter director.

ATTENDING A LUNCHEON of top management in the foundry industry of Northern California to discuss the matter of having a West Coast University have a Foundry Course scholarship supported by F.E.F. are, left to right: John Bermingham, chairman, Northern California Chapter; James Campbell, foundry instructor, University of California, Berkeley; E. J. Walsh, executive director, Foundry Educational Foundation, guest speaker, and E. F. Marquardsen, Pacific Steel Castings Co.

AFS Chapter Chairmen

Frederick J. Boeneker, chairman of the St. Louis District Chapter of AFS, is sales engineer of Bronze Alloys Co., St. Louis. He was born in Mexico and received his education in Mexico City at the German School. In 1927 Mr. Boeneker became associated with the National Bearing Div., American Brake Shoe Co., St. Louis, working in their export and engineering departments, and in 1940 he joined Bronze Alloys as sales engineer. At present he is program chairman of the Missouri Valley Regional Conference.

Daniel Elwert Best, chairman of the Philadelphia Chapter of AFS, is superintendent of the brass foundry, Bethlehem Steel Co., Bethlehem, Pa. After graduating from Lehigh University, he began his foundry career with Bethlehem Steel as a hot blast man. In 1940, after working in other departments for several years, he became supervisor of production of the brass foundry and in 1949, superintendent. Mr. Best has been vice-chairman, program chairman, a director, and publicity chairman for the Philadelphia Chapter of AFS.

and AFS General Manager Wm. W. Maloney. The top management from firms in the Montreal area and guest speakers attended the directors dinner prior to the general meeting. Wm. Dunn, acting chapter chairman, opened the general meeting and National Director Ewing Tait, introduced the speakers.

Mr. Maloney gave an interesting talk on some of the things the AFS had accomplished during the past few years. He also asked that top management present give their support to the members of the chapter, and encouraged them to take an active part in the society.

Mr. Robertson created interest with a variety of subjects, including the increased use of arc-air and flame washing to replace chippers. One of the reasons being the rate of partial deafness due to the high frequency noise of the chipping hammer. —*P. von Colditz.*

Metropolitan

More than 150 members and guests, including Wm. W. Maloney, AFS General Manager, attended the January meeting at the Essex House, Newark, N. J., to hear Prof. H. F. Taylor, Massachusetts Institute of Technology, speak on *"Exothermic and Insulating Materials for Castings".*

Prof. Taylor discussed the theory and usage of insulating and exothermic materials for risers, commencing with a review of heat transfer phenomena in the solidification of castings. He defined the character and comparative values of heat loss factors, and pointed out the technical advantages of certain types of insulating and exothermic materials in promoting favorable thermal gradients in risers. The comparative efficiencies of sleeve, pad and hot-top materials, and combinations of these, were presented, and illustrated with factual data secured from laboratory studies and field investigations by M. I. T. and other researchers.

The talk was followed by a question and answer period which included discussions of heat transfer in molds, economics of hot-top and sleeve usage.—*S. B. Donner.*

Washington

Donald J. Reese, International Nickel Co., Inc., was guest speaker at the January meeting held at the Stewart Hotel, Seattle, and his subject was *"Melting Department of an Iron Foundry".*

Mr. Reese illustrated the many technological advances that have been made through science and industry in the past 15 years and included the many steps forward the foundry industry has made since World War II. To keep abreast of the steps from hand molding to machine molding and now automation, our melting department must advance concurrently.

He showed many examples of losses in the cupola with special notations how considerable savings can be made. By far the majority of foundries operating cupolas have furnace losses in iron, silicon, manganese and other elements which far exceed a necessary loss. The reasons for these losses can be numerous, but one which should bear considerable investigation is the coke size used in a furnace. For the average size cupola of 30 in. diameter, the coke size should usually be

AFS Chapter Chairmen

Harry F. Greek, president, Hill & Griffith Co., Cincinnati, is chairman of the Cincinnati District Chapter of AFS. After attending the University of Cincinnati, he began his foundry career at Hill & Griffith in 1934 as a foreman. In 1937 he was made a salesman until 1941, when he became secretary of the company. In 1945 Mr. Greek was made president of Hill & Griffith. He has held the position of vice-chairman, program chairman, secretary, and director of the Cincinnati District Chapter of American Foundrymen's Society.

Howard H. Havies, chief estimator, Vivian Diesels & Munitions, Ltd., Vancouver, B. C., is the chairman of the British Columbia Chapter of American Foundrymen's Society. After graduating from Vancouver Technical High School, Mr. Havies was employed by Boeing Aircraft, Vancouver, as an expeditor until 1943. From 1943 to 1946 he was in the Canadian Army, during which time he achieved the rank of corporal. He then began work in foundry sales with Vivian Diesels & Munitions, and in 1952 he became chief estimator.

WALTER NAPP, DELTA OIL PRODUCTS CO.

WISCONSIN . . H. J. Heine, AFS Technical Director, left, talking with N. N. Amrhein, Federal Malleable Co., West Allis, Wis. at the January meeting. Mr. Heine was guest speaker and his subject was "Casting Design." Meeting was held at the Schroeder Hotel, Milwaukee.

BIRMINGHAM DISTRICT . . J. Lowe, Mid Continent Steel Castings Corp., guest speaker at the January meeting, left, with chaper chairman E. E. Pollard. Meeting was held at the Tutwiler Hotel, Birmingham, and 65 members and guests attended.

S. N. FARMER, SAND PRODUCTS CORP.

NORTHEASTERN OHIO . . Left, Dave Clark, Forest City Foundries and chapter chairman, talking with AFS National Director, Frank Cech, Cleveland Trade School, at the January meeting.

KEN SHECKLER, CALMO ENGINEERING CO.

SOUTHERN CALIFORNIA . . Left, D. J. Reese, International Nickel Co., guest speaker at the January meeting, being introduced by W. C. Baud, Mechanical Foundries Div., Food Machinery Corp. Meeting was held at the Rodger Young Auditorium and 125 members and guests were in attendance.

between 2 and 3 in. with a coke charge of approximately 10 lb per square foot of cupola area.—*William K. Gibb.*

Northeastern Ohio

Speaker at the January meeting was Hans J. Heine, AFS Technical Director, whose subject was, *"Another Approach to Casting Design."*

Too often, Mr. Heine stated, a structure is cast only when it cannot be shaped economically in any other way, and such practice can lead to poorly designed, overly complex machinery. In the field of stress, for example, the effects of dynamic loading and fatigue upset calculations based on static load strengths, with which most textbooks are concerned. Basic strengths of materials, he emphasized, are modified by stress concentration, temperature, temperature differentials, corrosion, bi- and tri-axial stresses, residual stress, impact loads and severe occasional overloads.

Casting designers should strive for high strength and light weight at low cost. They should avoid abrupt changes in section and beware of stress concentrations. Simplification can work miracles. It can save money, cut weight, reduce the number of defectives produced and improve the performance of parts.

Mr. Heine also discussed brittle lacquer stress testing, which he described as a simple, inexpensive way to find out where stresses are located and in what degrees.—*J. C. Misko.*

Twin City

At the January 11 meeting, E. C. Zirzow, Werner G. Smith, Inc., Cleveland, spoke on the technology of core blowing. In his talk, he outlined the principles upon which a good core blowing operation is based. Factors which effect the working properties of the core sand were considered, as well as those pertaining to the mechanics of the blowing operation. Mr. Zirzow concluded his talk with an illustrated summary of the various types of core blowing machines available. He pointed out their limitations and mechanical features.

Nathan Levinsohn, Minneapolis Moline Co., Minneapolis, directed the technical meeting on casting defects, held at Archer-Daniels-Midland Co. research laboratory on January 18. These meetings are group discussions in which an individual foundry's technical problems are analyzed.—*R. J. Mulligan.*

British Columbia

The January meeting of the British Columbia Chapter was held at Vancouver Vocational Institute, Vancouver, B. C., and Howard Havies, Vivian Diesels & Munitions, Ltd., presided. Donald J. Reese, International Nickel Co., Inc., was guest speaker and his subject was *"Melting Department of an Iron Foundry."* Mr. Reese was accompanied by his associate Al Zymer also of International Nickel.—*J. T. Hornby.*

S. N. FARMER, SAND PRODUCTS CORP.

NORTHEASTERN OHIO . . At the January meeting, from left to right, N. J. Stickney, Sand Products Corp., and H. E. Heyl, Federal Foundry Supply Co.

QUAD CITY . . D. E. Gilchrist, Deere & Co., left, technical chairman, and W. R. Jennings, John Deere Waterloo Tractor Works, right, guest speaker at the January meeting.

E. H. MOSSNER

SAGINAW VALLEY . . Professor R. A. Flinn illustrating a point in his talk "Research in Tomorrow's Foundry Problems" at the January meeting held in Frankenmuth, Mich. Approximately 125 members and guests attended.

H. BODWELL, GENERAL ELECTRIC CO.

EASTERN NEW YORK . . H. J. Heine, AFS Technical Director, speaking on "AFS Research—Your Foundry's Silent Partner" at the January meeting. More than 75 members and guests attended the meeting, which was held at Panetta's Restaurant, Menands, N. Y.

CENTRAL MICHIGAN . . Left to right: G. R. Lloyd, chapter vice-chairman; E. J. Walsh, Foundry Educational Foundation and speaker of the evening; AFS Past President F. J. Walls, International Nickel Co.; and C. L. Carter, AFS Immediate Past President, at the annual Youth Encouragement night, January 19.

Other Organizations

Reading Foundrymen's Association

John W. Juppenlatz, Quaker Alloy Casting Co., Myerstown, Pa., was the principal speaker at the January meeting of the Reading Foundrymen's Association held in the ballroom of the Berkshire Hotel.

Guests of the Association were Professor W. P. Winter, foundry instructor, School of Engineering, Pennsylvania State College, and his current class of 12 in-training industrial educational teachers. Other guests included industrial education teachers from all of the schools in Reading and Berks County. Mr. Juppenlatz, a metallurgist in the steel industry for the past 30 years, discussed the progress that has been made in the production of steel and alloy castings during the past decade.

A reception preceded the dinner meeting which was attended by over 100 members and guests. President James Woodward presided at the business session and Robert M. Schumo, Pennsylvania Electric Steel Castings Co., Hamburg, Pa. served as technical chairman and introduced the guest speaker.—*W. I. Cassidy.*

New England Foundrymen's Association

More than 200 members and guests attended the 59th Annual Meeting of the New England Foundrymen's Association, held January 12, at which time officers were elected and installed for 1955.

Officers elected were: president, Howard B. Nye, Crompton & Knowles; vice-president, Ahti Erkkinen, Builders Iron Foundry, and secretary-treasurer, Thomas I. Curtin, Jr., Waltham Foundry.

Members elected to the Executive Committee were: Henry M. Frechette, Fitchburg Foundry Co.; Albert M. Nutter, LeBaron Foundry Co.; Clyde Armstrong, Warren Pipe Co.; C. W. Hutchins, Standard Foundry Co.; Alexander Beck, Whitman Foundry, Inc.; William Ohlson, Draper Corp.; Frank Benoit, Brown & Sharpe; William Hale, Chapman Valve Co., and Charles A. Reed.—*Alexander Beck.*

Connecticut Non-Ferrous

F. R. Smith, apprenticeship representative, U. S. Dept. of Labor, Bridgeport, Conn., was guest speaker at the January Meeting of the Connecticut Non-Ferrous Foundrymen's Association held at the Quinnipiack Club, New Haven, Conn. His subject was *"Apprentice Training."*

Mr. Smith's introductory remarks touched the early history of metal working and research development in non-ferrous metal castings. It was indicated that the foundry industry is undergoing a state of technological and productional change due to mechanization and labor problems.

Mechanical changes can be purchased. The more changes in equipment of product, the higher calibre and flexibility in help is required to quickly adapt itself to the new environment.

Mr. Smith referred to the statement which appeared in the Talk of the Industry page in the December, 1954 AMERICAN FOUNDRYMAN "Loss through death and retirement in the next ten years is estimated at 18,000, while entrances into the industry will be only 14,000." A recent survey disclosed that the cost for hiring at the rank and file level is $300, and $1,000 or more for key personnel. This is the cost for hiring expenses until a production commensurate with wages is reached. Apprenticeship training was urged.—*F. B. Diana.*

Chapter Meetings

March

1 . . Rochester
Hotel Seneca. David Stein, chief metallurgist, Samuel Greenfield Co., Inc., Buffalo, *"Melting and Fluxing of Non-Ferrous Metals."*

2 . . Toledo
Toledo, Ohio. Sol L. Gertsman, Canadian Bureau of Mines, *"Desulphurization of Steel & Iron Alloys."*

3 . . Canton District
Elks Club, Alliance, Ohio. H. G. Robertson, American Steel Foundries, Alliance, *"Benefit of AFS Affiliation."*

7 . . Metropolitan
Essex House, Newark, N. J. Highlights of AFS Activities. Harold L. Ullrich, foundry engineer, Livingston, N. J.

7 . . Central Illinois
American Legion Hall, Peoria. W. A. Hambley, Charles A. Krause Milling Co., *"Casting Defects."*

7 . . Central Indiana
Athenaeum, Indianapolis. Harold F. Bishop, metallurgist, Naval Research Laboratory, *"Gating and Feeding."*

7 . . Chicago
Chicago Bar Association. Dr. F. B. Rote, technical director, Albion Malleable Iron Co., *"Blow-Squeeze Molding."*

7 . . Western Michigan
Fingers Restaurant, Grand Rapids, Zigmond Madacey, Beardsley & Piper Div., Pettibone-Mulliken Corp., *"Core Making and Core Blowing."*

8 . . Northern Illinois-Southern Wisconsin
Beloit Country Club, Beloit, Wis. Harry H. Kessler, manager of foundry operations, Sarbo-Mat-Process Engineers, St. Louis, *"Gating and Risering."*

8 . . Twin City
Covered Wagon, Minneapolis. Panel Discussion. Moderator: H. H. Blosjo, metallurgist, Minneapolis Electric Steel Castings Co. Panel: Nathan Levinsohn,
continued on page 93

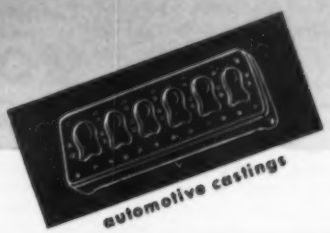
WESTERN MICHIGAN . . Chapter officers and their wives at the Christmas Party held at the Muskegon Country Club, from left to right, facing the camera: Secretary, C. H. Cousineau and Mrs. Cousineau; vice-chairman G. W. Bartlett and Mrs. Bartlett (center foreground); chairman John A. Van Haver and Mrs. Van Haver, and Mrs. Laforet and treasurer H. A. Laforet.

New 4 way BREAKOFF NICK

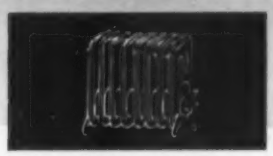
on fine FANNER shoulder radiator chaplets

saves *time* and *money*... improves castings

IDEALLY SUITABLE FOR



automotive castings



radiator castings

stove parts castings

EXCLUSIVE *New* 4-WAY BREAKOFF NICK

Provides maximum support during pouring, yet stem breaks off easily in any direction so that few remaining after shake-out can be easily brushed off with no apparent surface marks remaining.

STAGGERED KNITTING NICKS

Provide better type of surface for knitting with molten metal, assuring thorough fusion and resulting in clean, solid castings.

A small change in design can often result in large savings in production. The new 4-way breakoff nick on fine FANNER Shoulder Radiator Chaplets is a typical example of the constant study given to casting methods by FANNER engineers. This small but highly important feature, in addition to the other exclusive advantages offered by FANNER Radiator Chaplets, speeds the production of clean, sound castings...help cut labor costs.

Fine FANNER Radiator Chaplets are especially suitable for light pressure castings such as gas burners, radiator sections and manifolds. Designed for use with the side of largest bearing area against green sand, they will support approximately 5 pounds per square inch load.

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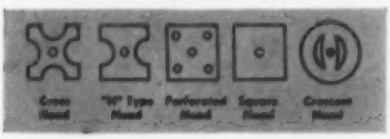
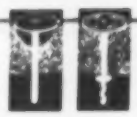
OTHER TYPES OF FINE FANNER SHOULDER RADIATOR CHAPLETS



NO HAND TUCKING



The special FANNER "open head" eliminates need for hand "tucking" and permits jolt and squeezer machines to pack sand solidly (as shown) along *entire* stem.

STURDY SHOULDER AND SOLID RIVETED HEAD

Shoulder is designed and placed to permit chaplet to be set into pattern required distance without guesswork. Solid riveted head exactly at right angles to stem to insure that chaplet is always perfectly "true".

THE FANNER MANUFACTURING CO.

Designers and Manufacturers of Fine Fanner Chaplets and Chills

BROOKSIDE PARK CLEVELAND 9, OHIO

Quiz Answers

Following are the correct answers for the quiz on page 65.

1. False. Two sands with the same grain fineness number can have a totally different surface area and, therefore, binding characteristics. The grain shape and grain distribution controls the workability, permeability, green strength, and other physical properties.

2. False. Although clay usually increases core green bond, it also increases hot strength (retards collapsibility) and decreases baked tensile strength. A pound of core oil usually must be added for each pound of clay to maintain a given baked strength.

3. False. Although accurate measurement and control of amount of binders in a core sand mix is necessary for accurate green compression and baked tensile control, baking time and temperature and method of fabrication of the core are equally important. Degree of ram or blow and degree of bake affect these properties greatly and must be controlled also to obtain uniform core properties regardless of the mix.

4. False. For many years 7½ lb has been considered to be the weight of one gallon of core oil. Actually core oils vary in weight per gallon according to manufacturer, grade, and temperature at which the weight is measured. For this reason the only accurate method of purchasing and measuring core oil is by the pound.

5. False. Most cereal binders vary in density not only between different types, but also among the same type. This is dependent upon coarseness of grind, moisture content, and degree of packing. For this reason a routine check on density is advisable and addition by weight is recommended.

6. False. Sands too, vary in weight per unit volume according to grain fineness, screen distribution, and amount of moisture present. Again, the only accurate method of measurement is by weight.

7. False. The sequence of addition of ingredients to a core sand mix is of paramount importance. Correct sequence can increase baked strength and green bond by as much as 50 per cent using the same amount of the binders. The important thing to remember is that cereal and water should be added one after the other so as to form the optimum paste; oils or resins, which tend to waterproof the cereal, are added last.

8. False. Varying the moisture content of a sand, cereal, oil core sand mixture may vary the ultimate baked strength by as much as 50 per cent. It is the moisture-cereal ratio which is important.

9. True. As in No. 8, it is the moisture-cereal ratio which is important.

10. True. Since the core will not attain a temperature much above 212 F in the oven until moisture is evaporated, the more moisture in the mix, the slower the core will bake.

11. False. Other factors which effect baked tensile strength include the grain fineness of the sand (the coarser sand will give more strength for a given amount of binder), the degree of ram, the amount of moisture present, the amount and quality of binders, and the degree of bake. Since more oil produces more gas and since core oil is usually the most expensive binder in the mix, it is wise to check all other factors first before adding more oil for increased tensile strength.

12. False. Although organic binders such as cereal, core oil, and resins do affect high temperature properties of the core slightly, these differences are too minute to be depended upon as a primary factor in preventing metal penetration. Penetration is controlled by the refractory materials in the core—the sand and high temperature binders such as clay, bentonite, silica flour, and iron oxide. Core density and degree of ram are also important. Organic binders such as core oils and cereal burn out at about 800 F and are of very little value thereafter.

13. False. Cereal is an excellent source of green bond and also has the added advantage of supplying some baked strength as well; but it does cost money and does produce gas when metal is poured. Therefore, before adding it, it is wise to check the sand fineness and grain distribution, moisture to cereal ratio, and degree of ram. Bentonite will give more green bond per unit of weight than will cereal and produce no gas. Bentonite, however, detracts from baked strength and requires additional oil to maintain a given baked strength. Addition of any binder to improve one property will also affect other properties and it is best to analyze the whole picture, including methods of core making, before selecting the best solution to a given problem.

14. False. No core oil adds green bond to the core sand mixture. Native lubricity results in a reduction in green bond when oil is added to the mix. While some core oils do affect green bond of a mix more than others, these differences are minute and are best compensated for by varying amounts of green bond-producing additives such as cereal, clay, and bentonite.

15. False. This is a corollary to Number 12. Since core oils, cereals, and other organic binders burn out at about 800 F, they have only a marginal effect upon the collapsibility of the core sand mixture under the heat of metal. The dominant factors in controlling collapsibility are sand grain fineness and screen distribution, and presence or absence of hot strength-producing materials such as bentonite, clay, silica flour, and iron oxide. Density of the core and degree of ram also affect this property. The best way to achieve collapsibility in a core sand mix is to use clay-free sands on the coarse side and the minimum amount of binder which will give sufficient baked strength for core handling. The addition of a cellulose material will also accelerate collapsibility.

16. False. Each core binder has its own baking characteristics. Urea formaldehyde bakes best at 300-325 F. Phenol formaldehyde and traditional core oils bake best at about 400-425 F. In each case raising the temperature above the optimum for a given binder results in a lower ultimate tensile strength and a shorter plateau of ultimate strength and therefore less margin for error in overbake and underbake of cores. The best way to speed bake is to keep moisture low, control oven temperature, and be sure that cores obtain plenty of air (oxygen).

17. True. There are two concepts which must be considered. First is the speed at which the core will attain a given tensile strength; second is the speed in which a heavy chunk core will bake through. There is no necessary correlation between the two, speed of tensile strength attainment being a function of the resinous components of the binder, whereas speed of baking through is primarily a function of the drying oil in the binder.

18. False. The two primary factors affecting gas formation from a core when metal is poured are the amount of organic binder present and the degree of bake of this binder. Thoroughly baked organic binders all give off about the same amount of gas per unit. Therefore, it is difficult to correct a gas or blow problem by changing binders and using the same amount. The speed of gas formation is as important as the total amount of gas therefore measurements of gas from a core should be in terms of pressure or rate of evolution. To reduce gas from a core the least amount possible of organic binder should be used and the cores should be thoroughly baked. Since coarse sands give higher baked tensile strength with less binders, the sand is also an important consideration.

19. True. So many factors affect the ultimate tensile strength of a core that type of binder used can, in some instances, be a minor factor. Sand grain fineness and screen distribution, amount of moisture present, degree of ram and denseness of core, baking time and temperature, sequence of core ingredient addition are all important factors in attaining a given core tensile strength.

20. False. Spraying cores with moisture before they enter ovens is a good practice because the moisture activates the cereal and produces a harder core surface.

21. True. Urea formaldehyde is generally conceded to be the fastest baking binder for cores. It bakes best at 300-325 F. Alkyd resins and many "fast baking" core oils approximate the speed of phenol formaldehyde.

22. False. Cereal binder in a core sand mixture increases green strength, baked strength, hardness, and workability; it decreases flowability, density, moisture resistance, and storage life.

Chapter Meetings

continued from page 90

foundry superintendent, Minneapolis Moline Co., *"Cast Iron Sands"*; Ed Anderson, sand technician, American Hoist & Derrick Co., *"Steel Sands"*; Carlton C. Hitchcock, vice-president, R. C. Hitchcock and Sons, Inc., *"Non-Ferrous Sands."*

8 . . Mid-South
Rebel Motel, Memphis, Tenn. Hans J. Heine, technical director, American Foundrymen's Society, *"Effect of Gating Design on Casting Quality."*

10 . . St. Louis District
York Hotel, St. Louis. Guy A. Pealer, General Electric Co., Elmira, N.Y., *"Pattern Engineering and Coordination of Methods to Produce Better Castings."*

10 . . Northeastern Ohio
Tudor Arms Hotel, Cleveland. B. C. Yearley, director of applied research, Process Control and Supervisory Training, National Malleable & Steel Castings Co., Cleveland, *"Casting Defects."*

11 . . Philadelphia
Visitation to the Dobbins Vocational School. Panel discussion: *"Training Foundry Personnel."*

11 . . Eastern Canada
Panel discussion of casting tolerances.

11 . . Birmingham
Tutwiler Hotel, Birmingham, Ala., Educational picture.

14 . . Cincinnati District
Suttmiller's Restaurant, Dayton, Ohio. B. C. Yearly, director of applied research, National Malleable & Steel Castings Co., *"Gating and Risering."*

14 . . Central Ohio
Seneca Hotel, Columbus. Palmer Derby, Lynchburg Foundry Co., *"Shell Molding."*

14 . . Timberline
Oxford Hotel, Denver. R. H. Groman, Eutectic Welding & Alloys Corp., *"Foundry Welding & Reclamation."*

14 . . Michiana
Oliver Hotel, South Bend, Ind. Ferrous: F. J. McDonald, factory manager, Saginaw Malleable Iron, Saginaw, Mich., *"Gating and Its Effect on Castings"*; Non-Ferrous: J. G. Kura, chief of research, Battelle Memorial Institute, Columbus, Ohio, *"Titanium, The Wonder Metal."*

16 . . Central Michigan
Hart Hotel, Battle Creek. H. M. St. John, superintendent of non-ferrous foundry operations, Crane Co., *"Brass & Bronze Foundry Practice."*

18 . . Tri-State
Alvin Hotel, Tulsa, Okla, *"Pattern Engineering and Rigging."*

18 . . Texas
Western Hills Hotel, Fort Worth. Aubrey J. Grindle, president, Grindle Corp., Harvey, Ill., *"Dust, Smoke, and Fume Control in the Foundry Industry."*

21 . . Quad City
Hotel Fort Armstrong, Rock Island, Ill. D. R. Forrest, Cleveland Cliffs Iron Co., *"America's Iron Future."*

continued on page 94

NORTHWESTERN PENNSYLVANIA . . Group attending the January meeting to hear G. L. Hoobler, International Nickel Co., Inc., speak on "Ductile Iron." Meeting was held in the Moose Club, Erie, Pa. Chapter directors held a noonday meeting with AFS General Manager Wm. W. Maloney, National Director Thomas Kavony, Jr., and Administrative Assistant, D. J. Hayes, attending.

NORTHERN CALIFORNIA . . At the January meeting, from left to right: AFS National Director B. G. Emmett, L. A. Steel Castings Co.; guest speaker D. J. Reese, International Nickel Co., being interviewed by J. M. Kaney, editor, The Coast Caster, monthly house organ of the chapter.

BROOKLYN POLYTECHNIC . . Group and hosts at a visit to the Mahwah, New Jersey Foundry of American Brake Shoe Co. Top row, left to right; W. K. O'Neil, Jim Wallmann, Tony Bich, Bob Mendelow, Bob Bardof, Ilmar Harras, Marty O'Toole and Bing Lieu. Next row, Ed Caracciola, Len Schoenman, Frank Cavanagh, Morris Ruddick, Marty Daniels and P. Elias. Next row: Emil Rogner, John McCallion, Ronald Gomes, Fred Pressman, Jim Galligan and Olev Paoul. Front row: Prof. W. H. Ruten and R. A. Martinson.

S. H. FARMER, SAND PRODUCTS CORP.

NORTHEASTERN OHIO. . Harold Wheeler, Superior Foundry, Inc., left, and J. H. Tressler, Hickman Williams & Co. right, at the Christmas Party.

Chapter Meetings

continued from page 93

25 . . Chesapeake
Engineers Club of Baltimore, Baltimore, Md. Castings Clinic with panel of experts.

25 . . Ontario
Royal Connaught Hotel, Hamilton, Ontario. William Stewart, plant metallurgist, Dominion Foundries & Steel Ltd., Hamilton, Ontario, *"New Testing Methods for Foundry and Process Control."*

April

4 . . Central Indiana
Athenaeum, Indianapolis. J. S. Schumacher, Hill & Griffith Co., *"Pressure Molding."*

4 . . Metropolitan
Essex House, Newark, N. J. H. F. Bishop, Naval Research Laboratory, *"Feeding Castings."*

4 . . Central Illinois
American Legion Hall, Peoria. Clyde A. Sanders, vice-president, American Colloid Co., *"Effect of Molding Materials on Apparent Metal Shrinkage."*

4 . . Chicago
Chicago Bar Association, Chicago. Malleable & Gray Iron Div.: Lyle Jenkins, Wagner Malleable, *"Production and Characteristics of Pearlitic Malleable and Ductile Irons"*; Steel and Maintenance Div.: Samuel Arnold III, consultant, *"Electric Furnace Operation and Maintenance"*; Non-Ferrous Div.: George W. Anselman, consultant, *"Natural or Synthetic Sands"*; Pattern Div.: Carl J. Johnson, Western Foundry Div., Consolidated Foundries, Inc., *"Patterns for the Atomic Age."*

4 . . Cincinnati District
Cincinnati Club, Cincinnati. National Officer's Night. J. B. Caine, consultant, *"Gates and Risers."*

4 . . Western Michigan
Cottage Inn, Muskegon, Mich.

5 . . Rochester
Hotel Seneca, Rochester. T. E. Barlow, sales manager, Eastern Clay Products Div., International Minerals & Chemical Corp., *"High Pressure Molding."*

5 . . Rochester
Seneca Hotel, Rochester, N. Y., T. E. Barlow, sales manager, Eastern Clay Products Dept., International Minerals and Chemical Corp., Chicago, *"High Pressure Molding."*

6 . . Toledo
Toledo Yacht Club, Toledo. F. S. Brewster, vice-president, H. W. Dietert Co., Detroit, *"D Process."*

7 . . Canton District
Mergus Restaurant, Canton, Ohio. Douglas James, Cooper Bessemer Corp., Grove City, Pa., *"Nodular Iron."*

7 . . Saginaw Valley
Fischer's Hotel, Frankenmuth, Mich. Iron: D. E. Matthieu, Alabama Pipe Co., Anniston, Ala.; Steel: Warren Lewis, Great Lakes Foundry Sand Co., Detroit; Light Metals: Arthur Greene, Allison Div., General Motors Corp.

8 . . Philadelphia
Engineers Club, Philadelphia. Charles Mooney, Jr., Olney Foundry, Link-Belt Co., Philadelphia, *"Guide to Core Mixtures."*

11 . . Michiana
Elkhart Hotel, Elkhart, Ind. Entertainment Meeting. Plant visitations, film, and entertainment.

11 . . Central Ohio
Seneca Hotel, Columbus, Ohio. H. F. Bishop, head, Casting Section, Naval Research Laboratory, *"Gating and Risering."*

11 . . Timberline
Oxford Hotel, Denver. Regional Officer Night. J. O. Klein, *"Steel Casting."*

12 . . Northern Illinois-Southern Wisconsin
Lafayette Hotel, Rockford, Ill. Clyde A. Sanders, vice-president, American Colloid Co., *"Have You Seen These Defects."*

12 . . Twin City
Covered Wagon, Minneapolis. Panel discussion, *"Practical Quality Control."* Moderator: Nathan Levinsohn, foundry superintendent, Minneapolis Moline Co. Panel: Ralph Brown, chief inspector, Minneapolis Moline Co.; Frank Berchem, assistant superintendent in charge of Cleaning and Finishing Dept., Northern Malleable Iron Co.; John Upgren, foundry superintendent, Northern Ordnance, Inc.; and H. H. Blosjo, metallurgist, Minneapolis Electric Steel Castings Co.

14 . . Northeastern Ohio
Tudor Arms Hotel, Cleveland. National Officers and Apprentice Night. Movie: *"Man with 1,000 Hands."*

15 . . Tri-State
Tulsa. *"Steel Foundry Practices."*

15 . . Birmingham
University of Alabama, Tuscaloosa, Ala. Luncheon and demonstration at the University foundry.

29 . . Chesapeake
Engineers Club of Baltimore, Baltimore, Md. Warner B. Bishop, Archer-Daniels-Midland Co., Cleveland, *"The 'D' Process of Shell Molding."*

Technical Educational Program Sponsored by Western N. Y.

Members and non-members of the Western New York Chapter of AFS can still attend, free of charge, the remaining meetings of the Technical Educational Program, sponsored by the chapter, at Erie County Technical Institute, Buffalo, N. Y.

March 3, J. Harold McKay, Lumen Bearing Co., will discuss *"Metallurgy of Brass and Bronze Foundry Alloys."* J. A. Terpenning, Metal and Alloy Specialties Co., Inc., will discuss *"Shell Molding Practice"* at the March 16 meeting. At the March 30 and April 6 meetings, *"Radioisotopes in Foundry Inspection"*, will be discussed. Speakers are to be announced later.

Chapter Offers Safety Course

A training course on the Fundamentals of Foundry Safety will be conducted at the Beloit Vocational and Adult School, 1149 Fourth St., Beloit, Wis., on March 24 and 25 from 9 am to 5 pm. The two-day conference-style course is sponsored by the Northern-Illinois and Southern Wisconsin AFS Chapter in cooperation with the Safety, Hygiene, and Air Pollution Committee of the American Foundrymen's Society.

Managers of smaller foundries and plants with limited personnel or those who have not established a workable plant safety program will be particularly interested to know that the course emphasizes the fact that a good safety program need not be expensive, that the set up and personnel are described to show that it is simply "good business."

Because the setting up and carrying out of a successful safety program is essentially a supervisory function the course is designed to train production foremen, department supervisors, personnel men, maintenance engineers, and administrators for this responsibility.

Course instructors are specialists selected from the foundry industry. The class will be limited to 4 participants so that individuals will have the opportunity to discuss foundry safety procedures with the instructor and fellow foundrymen.

The two-day course includes discussion of the following subjects: Basics of Foundry Safety (organization of a safety program), Foremen's Safety Conferences, Foreman—the Key Man, Building Safety into the Plant, Plant Inspections, Building Safety into the Working Force (employee training), Maintaining Interest in Safety, Machine Guarding, Electrical Hazards, Materials Handling, Personal Protective Equipment, Accident Records and Analysis, Fire Prevention, Industrial Health Hazards and Control, and Housekeeping Hints.

The registration fee of $12.00 allows the course to be self-sustaining and includes sessions, instruction materials, two buffet luncheons served at the School, and a banquet on Friday evening. Application and registration fee should be sent to Richard A. Oster, Secretary, American Foundrymen's Society, Northern Illinois and Southern Wisconsin Chapter, Adult Vocational School, Beloit, Wis.

New Tentative Recommended Practice Issued by A.S.T.M.

American Society for Testing Materials Administrative Committee on Standards this fall accepted recommendations of Committee B-7 on Light Metals and Alloys, cast and wrought, for one new tentative recommended practice and the revision of eight existing tentative specifications.

In the revision of Tentative Specifications for Magnesium-Base Alloy Sand Castings (B 80) and for Magnesium-Base Alloy permanent Mold Castings (B 199) a new Table IV is added entitled "Properties and Characteristics" to give information on melting ranges, pattern shrinkage allowance, foundry characteristics, and other characteristics.

Revision of Tentative Specifications for Aluminum-Base Alloy Permanent Mold Castings (B 108) consists of adding a new temper for Alloy ZG42A. Tentative Specifications for Aluminum-Base Alloy Sand Castings (B 26) were revised by the addition of a new temper for Alloy ZG42A, and a change in the yield strength of Alloy ZG41A.

The Committee also approved for publication four new tentative methods of test proposed by Committee E-3 on Chemical Analysis of metals.

Two tours will follow the 1955 International Foundry Congress to be held in London Sunday, June 19, through Saturday, June 25. Host to the International Congress again after 16 years, the Institute of British Foundrymen has scheduled a week of technical sessions, social events, and visits to some 40 foundries. Headquarters for the Congress is Dorchester House, Park Lane, London, according to George Lambert, secretary, Institute of British Foundrymen, St. John Street Chambers, Deansgate, Manchester 3, England. The two post-Congress tours (arranged by Thomas Cook & Son) start Sunday, June 26, and return to London on Saturday, July 2. Tour No. 1 takes in the Shakespeare country—Birmingham, the East Midlands, and Manchester. Tour No. 2 covers Scotland, the North East Coast, and Sheffield. Foundries along the way will be open for inspection by the men while historic sites, fashion stores, a pottery company, and a chocolate factory will be visited by the ladies. Branches of IBF will play host at several stops on each tour.

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S.F.S.A. To Hold 53rd Meeting

The 53rd Annual Meeting of the Steel Founders' Society of America will be held at the Drake Hotel, Chicago, Monday and Tuesday, March 14 and 15. Featured in the program will be the awarding of prizes and honorable mention certificates to winners of the National Product Development Contest at the Tuesday noon luncheon. Awards were voted by a committee in accordance with the decisions made by a Board of Judges consisting of Prof. H. F. Taylor, Massachusetts Institute of Technology; T. C. DuMond, editor of *Materials & Methods*; and A. Walcher, American Steel Foundries, Granite City, Ill.

The meeting will open at 1 a.m. Monday, with S.F.S.A. President A. J. McDonald's report, *"The Year of Appraisal"*. C. W. Briggs, technical and research director, will speak on *"Horizons in Steel Casting Research"*. "Useful Facts From the Product Development Contest", will be covered by G. K. Dreher, secretary. The Lorenz Memorial Medal will be awarded at the Monday noon luncheon. R. C. Wood, chairman of the Technical & Operating Committee, will award prizes for the best *Steel Foundry Facts* article published during the year.

Monday afternoon session will be devoted to managerial problems. Chauncey Belkamp, society counsel, will speak on *"Why and Why Not"*. *"The First Step in Developing Managerial Talent"* is the subject of Dr. E. P. Janney, Rohrer, Hibler & Reprogle, Cleveland; and *"A Talent Source"* will be covered by E. J. Walsh, executive director, Foundry Educational Foundation.

Market subjects will feature the Tuesday morning session. Dean Clement Freund, University of Detroit, will cover *"The Engineering Future."* Colin Carmichael, editor of *Machine Design*, will speak on *"The Design Dilemma"*. *"Factors in the Shell Mold Market"* will be the subject of B. M. Ames, Doran Manganese Bronze Corp., Brooklyn, N. Y.

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FREE . . . New Folder gives complete details on Transite Core Plates and Slip Jackets—as well as Transite Pallite products for dielectric furnaces. For your copy of folder PP-31A, write Johns-Manville, Box 60, New York 16; in Canada, 565 Lakeshore Road East, Port Credit, Ontario.

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Johns-Manville TRANSITE CORE PLATES AND SLIP JACKETS

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Chicago Chapter Sponsors Molding Methods Program

An educational program, "Molding Methods for 1955", consisting of four lectures, will be sponsored by the Chicago chapter of AFS during March. The first session will start at the chapter's regular monthly meeting March 7 at the Chicago Bar Association, 29 S. La Salle Street, Chicago. Dr. F. B. Rote, Albion Malleable Iron Co., Albion, Mich., will be the speaker and his subject will be *"Blow Squeeze Molding."*

The remaining three meetings will be held in the Auditorium of the Peoples Gas Building, Adams St. and Michigan Ave., Chicago. March 14, D. B. Shannon, Summerville Iron Works, Chattanooga, Tenn., will speak on *"Diaphragm Molding."* C. W. Schwenn, Brillion Iron Works, Inc., Brillion, Wis., will speak on *"Shell Molding"* at the March 21 meeting and R. F. Meader, Whitin Machine Works, Whitinsville, Mass., will speak on *"Improvement of Conventional Molding Methods"* at the March 28 meeting.

Meetings will start at 7 p.m. and will last approximately two hours. Cost for attending the three meetings, other than the regular chapter meeting will be $1. Certificates will be presented to all attending three of the four lectures.

Enrollment blanks are being sent to all Chicago chapter members and surrounding chapters are being notified of the meetings. Tickets may be obtained at the door. W. O. McFatridge, International Harvester Co., Chicago, is chairman of the affair.

Accident Frequency Drops

Third quarter 1954 injury frequency rates for foundries show considerable improvement over the 1953 rates as shown by the following figures released by the U. S. Bureau of Labor Statistics:

	3rd Quarter	
	1954	1953
Gray Iron and Malleable	26.7	29.6
Steel	17.9	21.5
Non-Ferrous	19.1	23.0

These gains must be considered in the light of a drop in the all-industrial average from 13.4 for the year 1953 to 11.8 for the third quarter of 1954, Wm. N. Davis, AFS director of safety, hygiene, and air pollution control, points out.

Starting January 1, 1955, severity rates are calculated on the basis of 1000 man hours of exposure.

Abstracts

Abstracts below have been prepared by Research Information Service of The John Crerar Library, 86 East Randolph Street, Chicago 1, Ill. For photoduplication of any of the complete articles briefed below, write to Photoduplication Service at the above address, identifying articles fully, and enclosing check for prepayment. Each article of seven pages or fraction thereof is $1.40, including postage. Articles over seven pages are an additional $1.40 for each seven pages. A substantial saving is offered by purchase of coupons in advance. For a brochure describing Crerar's library research service, write to Research Information Service.

A561 . . "Mechanical Wet Sieve Testing Method," J. J. Kobliska and H. J. Rodenberger, *A. S. T. M. Bulletin*, No. 200, Sept. 1954, pp. 46-47. Description of machine and procedures for wet sieve testing of very finely ground materials.

A562 . . "Foundry Quality Control, Allin P. Deacon, *Canadian Metals*, Sept. 1954, pp. 30, 32, 34, and Oct. 1954, pp. 29-30 and 32. Introduction, procedures, and success of statistical quality control in the foundry of the Cockshutt Farm Equipment Ltd.

A563 . . "Marine High Duty Cast Iron Replaces Steel," E. C. Pigott, *Iron & Steel*, vol. 27, no. 10, Sept. 1954, pp. 441-445. Foundry procedures that were adopted to produce castings hydraulically tested at 450-500 psi.

A564 . . "Electric Steel Production," D. D. Howat, *Iron & Steel*, vol. 27, no. 10, Sept. 1954, pp. 446-450. Reviews of the many developments of the electric arc furnace and its relation to others for melting steel.

A565 . . "Open Model Gray Iron Foundry," Herbert F. Scobie, AMERICAN FOUNDRYMAN, vol. 26, no. 4, Oct. 1954, pp. 34-41. Plant write-up of the new Fairbanks, Morse & Co. Kansas City foundry shows facilities for 60 tons gray iron, 5 tons brass, and 1 ton stainless steel per shift under one roof.

A566 . . "Malleable Melting Control," L. E. Emery, AMERICAN FOUNDRYMAN, vol. 26, no. 4, Oct. 1954, pp. 42-46. Construction, maintenance, and atmosphere and slag control of melting units at Marion Malleable Iron Co.

A567 . . "How Slag Attacks Refractories," D. Dixon, AMERICAN FOUNDRYMAN, vol. 26, no. 4, Oct. 1954, pp. 47-50. Selection and testing of refractories with respect to their resistance to slag attack.

A568 . . "Conveying Core Sand," John H. Kauffman, AMERICAN FOUNDRYMAN, vol. 26, no. 4, Oct. 1954, pp. 51-55. How and why Studebaker incorporated pneumatic core sand conveyors with regular monorail distribution in modernizing the foundry.

A569 . . "Mechanized Permanent Mold Casting," Herbert F. Scobie, AMERICAN FOUNDRYMAN, vol. 26, no. 4, Oct. 1954, pp. 56-59. Layout and operations of the Garske Perm Mold foundry casting light metals in permanent molds.

A570 . . "How Coke Size, Screening, Handling Affect Cupola Melting," Woodrow W. Holden, AMERICAN FOUNDRYMAN, vol. 26, no. 5, Nov. 1954, pp. 38-40. How control of coke size saves fuel, limestone, and increases melting rate and maximum temperatures.

A571 . . "Coercive Force: Possible Measure of Degree of Malleablization," D. S. Eppelsheimer, and D. S. Gould, AMERICAN FOUNDRYMAN, vol. 26, no. 5, Nov. 1954, pp. 41-43. Measurement of magnetism of test specimens indicates the degree of malleablization obtained.

A572 . . "Re-Melt Shell Casing Scrap," E. D. Boyle, AMERICAN FOUNDRYMAN, vol. 26, no. 5, Nov. 1954, pp. 44-47. Facilities, layout, and procedures used at the Puget Sound Naval Shipyard to salvage shell casings.

A573 . . "Anybody Can Simplify Work," M. E. Annich, AMERICAN FOUNDRYMAN, vol. 26, no. 5, Nov. 1954, pp. 48-51. Principles of motion economy and flow chart picture simplify job standardization.

continued on page 98

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Abstracts

continued from page 97

A574 . . "By Direct Mail—Foundry Hits Selective Market," Harold Brown, AMERICAN FOUNDRYMAN, vol. 26, no. 5, Nov. 1954, pp. 52-53. How a large manufacturer of iron and steel castings profited from direct mail promotion.

A575 . . "System Sand Control," Morris Gittleman, AMERICAN FOUNDRYMAN, vol. 26, no. 5, Nov. 1954, pp. 54-58. The set up and control of system sand at Pacific Cast Iron Pipe & Fitting Co.

A576 . . Modern Design Characterizes New "Fairbanks, Morse Foundry," William G. Gude, *Foundry*, vol. 82, no. 10, Oct. 1954, pp. 104-111, 188-191. Plant write up of Kansas City foundry casting gray iron, brass, and stainless steel.

A577 . . "Wet Sand Reclamation," Hubert Chappie, *Foundry*, vol. 82, no. 10, Oct. 1954, pp. 112-114. Foundry making large steel castings cut cost of sand per ton of castings almost in two.

A578 . . "The Small Foundry can use Modern Methods," Edwin J. Jory, *Foundry*, vol. 82, no. 10, Oct. 1954, pp. 115, 264, 266-268. Establishing sources of information then evaluating operational, technical, and business data permits the small operator to be up-to-date without large investments.

A579 . . "Italian Malleable Foundry Designed and Equipped from Britain," *Foundry Trade Journal*, vol. 97, no. 1987, Sept. 30, 1954, pp. 383-385. Layout and equipment of foundry producing blackheart malleable by cupola-direct arc duplexing; hot blast, permanent receivers on cupolas capable of melting 2½ tons per hr.

A580 . . "Chemistry of Acid Electric Steelmaking," N. F. Dufty, *Foundry*, vol. 82, no. 10, Oct. 1954, pp. 120-125, 260-263. Discussion of slag systems, slag-hearth and slag-metal reactions and their control in melting steel in an acid electric furnace.

A581 . . "Quality Control in a Gray Iron Foundry," Lester Welty, *Foundry*, vol. 82, no. 10, Oct. 1954, pp. 126-129. How Dodge Mfg. Corp. foundry used statistical quality control to reduce scrap.

A582 . . "Theory, Economics, and Practical Application of Exothermic Materials," D. V. Atterton and R. C. Edmonds, *Foundry Trade Journal*, vol. 97, no. 1987, Sept. 30, 1954, pp. 373-380; vol. 97, no. 1988, Oct. 7, 1954, pp. 417-420; and vol. 97, no. 1990, Oct. 21, 1954, pp. 481-488 (discussion). Factors that influence and methods of ensuring the feeding of ferrous and non-ferrous castings are discussed. Examples of castings so produced are described, and methods of calculating costs are presented.

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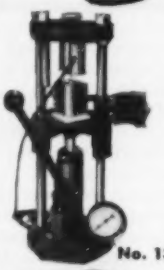

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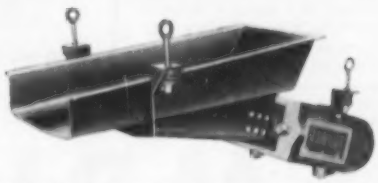

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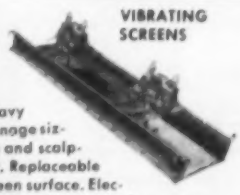

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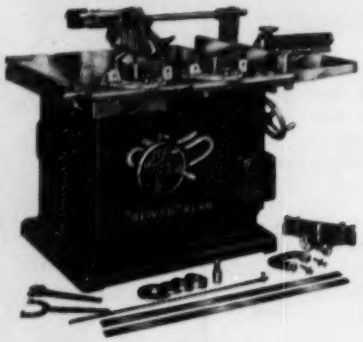

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Obituaries

Samuel Mairs, chairman of the board of directors at Archer-Daniels-Midland Co., died recently in Jamaica. He had been with the firm for 51 years, starting as bookkeeper. Five years later Mr. Mairs was made secretary and director of Archer-Daniels Linseed Co. and then served as treasurer from 1909 until 1911. In 1923, when Archer-Daniels-Midland Co. was incorporated, he was elected a director and secretary, and in 1924 Mr. Mairs was elected a vice-president of the company. He was elected executive vice-president in 1933, and held this position until 1947 when he succeeded the late Shreve Archer as chairman of the board of directors. Mr. Mairs held the distinction of having been employed with Archer-Daniels-Midland or one of its predecessors longer than any other person.

Charles S. Muir, a director of Palmyra Foundry Co., Inc., Palmyra, N. J., died recently. Mr. Muir joined Palmyra Foundry Co. in 1922 as sales manager and the following year was made director. In 1933 he was elected vice-president and sales manager. He retired from active participation in 1949 but continued as a director.

M. W. Hulse, sales manager, General Metals Corp., Oakland, Cal., died December 29. Mr. Hulse was a native of Santa Ana, Cal., and a graduate of Massachusetts Institute of Technology.

Manuel Camacho, coreroom foreman, Oakland Foundry Div., General Metals Corp., died recently.

F.E.M.A. Spring Meeting

The Spring Meeting of the Foundry Equipment Manufacturers Association will be held at the Sheraton-Carlton Hotel, Washington, D. C. on April 15, 1955.

Guest speakers at the meeting will be Joseph E. Flanagan, U. S. Public Health Service, Cincinnati, Ohio, and Professor Theodore F. Hatch, School of Public Health, University of Pittsburgh, Pittsburgh, Pa.

W. B. Wallis, F.E.M.A. president, said technical subjects to be discussed at the meeting will include, blast cleaning and tumbling, dust and fume control, flasks, furnaces and accessories, material handling and processing, and molding machines.

Accident Facts Booklet

The 1954 edition of the National Safety Council's statistical yearbook, "Accident Facts," is now available. It contains facts and figures on all types of accidents—industrial, traffic, home, farm and school.

It is priced at $.75 a single copy and less for quantities. Inquiries should be sent to the National Safety Council, 425 N. Michigan Ave., Chicago 11, Ill.

AFS Headquarters Seeks Old Transactions

The national headquarters of American Foundrymen's Society has an urgent need for used volumes of the official society *Transactions*.

The years specifically sought are 1947-1952, inclusive, through Volume 60. Books must be in good condition, and will be purchased at $2.50 each.

The demand for back issues of *Transactions* results from the constantly increasing membership of the society. Copies should be mailed to Book Section, American Foundrymen's Society, Golf & Wolf Roads, Des Plaines, Illinois.

Re-issue Poems by Walkins

Rammed Up and Poured, "a collection of selected poems and ballads written in a foundry by a foundryman for the edification of all foundrymen everywhere," has been re-issued in an inexpensive paper-bound edition.

In 41 illustrated poems, Bill Walkins, "the foundry bard," captures life in the foundry that includes a visit of the old timer to the mechanized shop, the trials of maintenance men, the havoc created by a woman-crazy core paster, pay day, woes of the molder, sand mill blues, and many other aspects of foundry life.

Bill sees comedy, tragedy, and drama and glamour in the life of every foundry worker. He presents philosophy in such verses as this from *"Soul Molding"* . . .

Nay! Life is like the founder's mold,
shaped in timeless sand,
And like the mold, it should be formed
with careful, skillful hand.
This temporary, sand-mold life assures
the ultimate goal
And must conform to pattern for the
casting of the soul.

Readers of AMERICAN FOUNDRYMAN are well acquainted with Bill's poems which appear as a regular feature of "The Foundrymen's *Own* Magazine," and will want to own this collection.

The paper-bound, 6 x 9 in., 72-page edition of *Rammed Up and Poured* by Bill Walkins, may be obtained for 25¢ from Electric Steel Foundry Co., 2141 N.W. 25th Ave., Portland, Oregon.

Apprentice Contest Deadline

April 1 is the deadline for receipt of patterns and castings expected to be included in the national judging of the 1955 AFS Apprentice Contest. On April 1, all national entries must be in the hands of: Prof. Roy W. Schroeder, General Engineering Dept., University of Illinois, Pier 47, Navy Pier, Chicago, Ill.

Classified Advertising

For Sale, Help Wanted, Personals, Engineering Service, etc., set solid..20c per word, 30 words ($6.00) minimum, prepaid.

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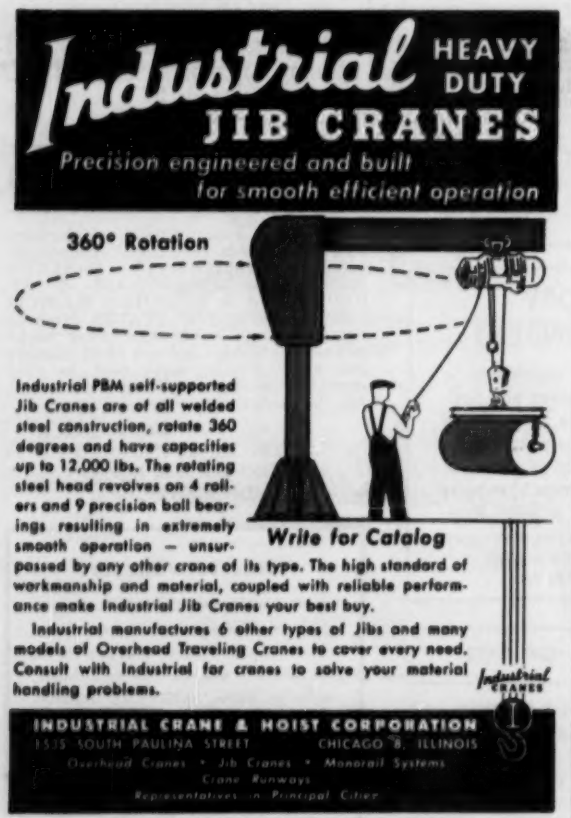
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Improved foundry methods demand a constant flow of modified oils and binders, as well as entirely new products for core making and molding. The need today is for greater efficiency at lower cost.

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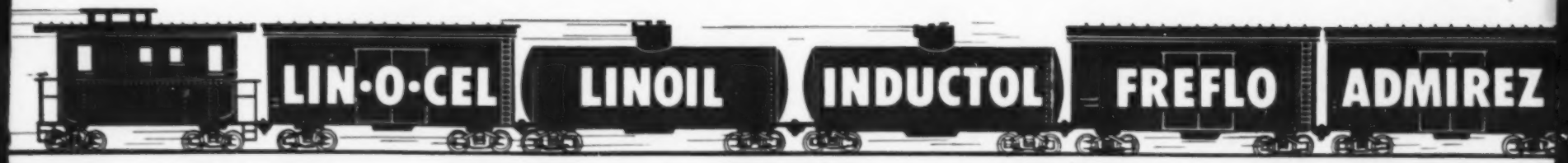

Archer **LIN•O•CEL** is the most effective sand stabilizer available. It improves flowability, which in turn, produces better tolerance and definition. Because LIN-O-CEL compensates for sand expansion, it stops rat-tails, buckles, and scabs which normally might occur due to denser rams made possible by improved flowability.

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FREFLO is used two ways: (1) As a core sand conditioning agent to reduce stickiness and improve workability. (¼ of 1% by weight should be added during the final 30 seconds of mixing.) (2) As a parting compound for metal molding patterns. FREFLO is a great aid in modern, high-speed equipment.

The most recent addition to the ADM line is **ADMIREZ** resin binders. Available in urea and phenol formaldehyde types in both liquid and powdered forms for cores. Phenol type also available in powdered form for "C" (or shell molding) process.

STOP!

Whether or not you are using ADM foundry products, it pays periodically to check your core mixture. Proper use of any material will save you production dollars. Your LINOIL man can assist you in analyzing your specific core problems. He is backed by fully equipped laboratories, experienced ADM chemists, and foundry technicians who will analyze your problems upon request.

WHEREVER YOUR FOUNDRY IS LOCATED, there is an ADM office close by. Contact the one in your locality for full details on the fastest-moving line in the foundry field. Addresses are listed here.

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Kansas City 2,
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Boston 9,
141 Milk Street

MICHIGAN
Detroit 35,
18911 James Couzens Highway

MINNESOTA
Minneapolis 2,
600 Roanoke Bldg.

MISSOURI
St. Louis 19,
No. 2 Armin

NEW YORK
Buffalo 3,
1524 Marine Trust Building
New York 7,
9th Floor, Woolworth Building

OHIO
Columbus 15,
1935 LeVeque Lincoln Tower
Toledo 5,
1152 East Broadway

PENNSYLVANIA
Lancaster
P. O. Box 1412
Philadelphia 18,
18 Hilltop Road

WISCONSIN
Milwaukee 16,
3003 W. Hopkins St.

CANADA
Montreal 1,
1215 Greene Avenue
Toronto 10,
200 Fairbank Ave.
Vancouver
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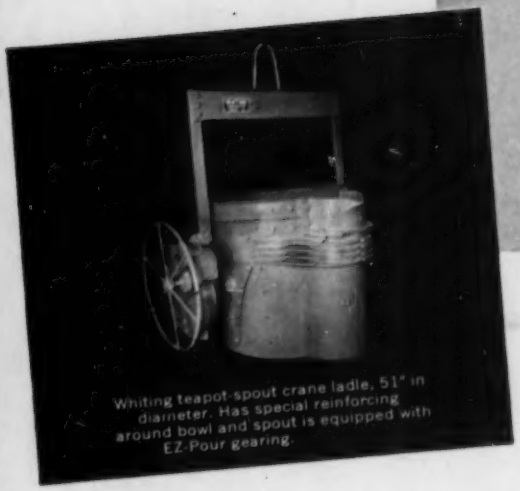
FOUNDRY PRODUCTS DIVISION • 2191 WEST 110TH STREET • CLEVELAND 2, OHIO

Whiting standard 26" ladle and truck, equipped with EZ-Pour gearing and insulated cover. Has closed standards and no bail. Truck has 16" dia. wheels for 24 gauge track. Other gauges available.



Whiting teapot-spout crane ladle, 51" in diameter. Has special reinforcing around bowl and spout is equipped with EZ-Pour gearing.

Equipped with V bail, this Whiting cylindrical ladle is 28" in dia. by 33" long. Also has sliding type cover with adjustable lever and EZ-Pour gearing.

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Remember, too—in addition to the "specials", Whiting carries a complete line of standard ladles . . . all known for their longer-lasting, economical performance. They include hand and shank ladles, covered trolley ladles, covered crane ladles, riveted crane ladles, geared and non-geared bottom-top ladles, cylindrical ladles, mixing and reservoir ladles.

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Whiting 27" by 90" U-Ladle with oil fired lining preheater and motor operated

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